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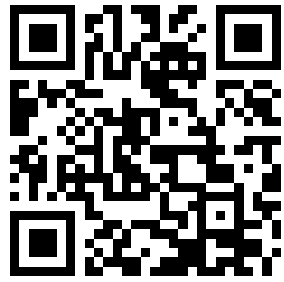

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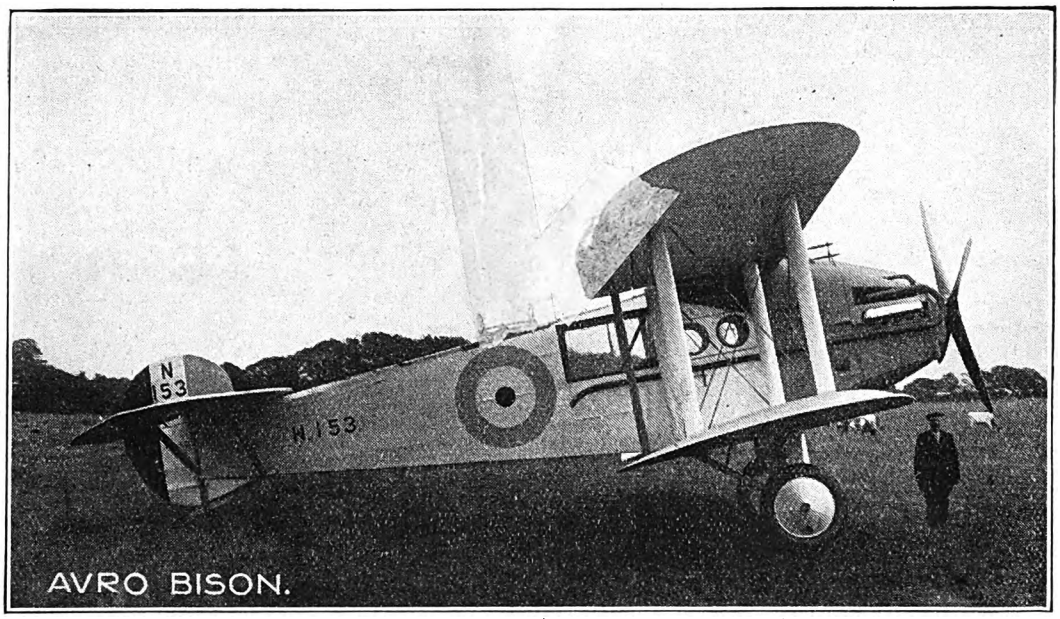

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ON 1922.

Taking it all round 1922 has not been a bad year. Equally it has not been a good year. But it *has* been a period of probation which has made it a very useful year. Trade in general and the Aircraft Trade in particular has been bad. But 1922 has proved who are the stayers just as 1920 and 21 discovered who were the quitters. The people and the firms who have managed to stay in aviation until to-day may be reasonably expected to survive until the genuine revival begins.

The one and only W. E. de B. Whittaker enunciated the theory some years ago that there is no such thing as a "mute inglorious Milton" for said he if a poet be mute and inglorious he is not a Milton because the real Milton has not only poetic genius but he has the qualities which force his genius to be heard. In other words, if a man has the right stuff in him he will come to the front in spite of obstacles and the more obstacles he encounters the stronger he will be for having overcome them.

Much the same philosophy applies to nations and trades as to individuals. And 1922 has provided a number of the obstacles which will ultimately prove to have strengthened the British Nation and the Royal Air Force and the Aircraft Industry and to have helped the progress of aviation.

Never have we in this country had as good cause as we have to-day for being proud to call ourselves English. The undefeatable stupidity and imperturbable good nature of the ordinary Englishman has carried us through a series of crises which would have wrecked any country populated or run by cleverer people. We won through quite a respectable war in spite of having the worst political leader in history and in spite of having no outstanding military genius to lead the Army and in spite of having the most muddle-headed Naval command imaginable. The English people held the country together, the Old Army regimental officer led the Army to victory and the Mercantile Marine did whatever was well done at sea with the help of a few intelligent junior R.N. officers.

To the unimaginative steady-going Englishman we owe the fact that to-day England's credit and England's prestige stands higher all over the world than that of any other nation. And to the same qualities we owe our pre-eminence in aviation. We have lived up to the doctrine "Be not the first by whom the new is tried, Nor yet the last to set the old aside." It is an attitude which makes the young-man-in-a-hurry froth at the mouth, for he always wants to be the first to try the new. But it ensures to him a peaceful and prosperous old age.

We need no Fascisti to combat Communism. Something over a year ago when the much-boomed Triple Alliance of Transport Workers, Railwaymen and Miners threatened a Bolshevik outbreak the dear old stupid War Office met them with a perfect transport organisation which had been lying in a pigeon-hole for months. And when the War Office asked for volunteers to work that organisation tens of thousands of solid stupidly sensible young and middle-aged Englishmen in well-worn trench-coats rolled up in their easy-going way ostensibly asking to be enlisted as transport workers but in their hearts hoping for a chance of "beating-up the Bolshies" as they put it. We saw then that our Fascisti are there ready-made when called upon by the properly constituted authority. Just as we had no Wellington or Napoleon in the War 1914-18 so we need no Mussolini in this Peace. It is the common sense of the Teuton Englishman that has seeen us through.

The same qualities have seen British Aviation through the difficult times of 1922. In spite of Mr. Lloyd George, the transcendant example of the self-seeking opportunist among politicians, the House of Commons as a whole has retained its English common sense. Consequently when Captain Guest, a plain straightforward Secretary of State, has proposed plain straightforward schemes for the Royal Air Force they have been accepted without serious argument. The Navy's attempts to wreck the R.A.F. have only provided obstacles which gave the Air Staff and the Air Council useful exercise to overcome. The common sense of Parliament has decreed that henceforth the Royal Air Force shall be the First Line of Defence not only of England but of the British Empire. And that alone has made 1922 well worth while.

The R.A.F. in 1922.

The R.A.F. during 1922 has overcome many obstacles and has much of which to be proud.

There have been many resignations and some few dismissals. The Force is the better for them. Those who have resigned have been those without faith in the future of the Air Force and it is the stronger because these weaker brethren have been removed. Some of them one knows were clever young men whose cleverness will always be a danger to them because it is coupled with impatience of anybody who does not recognise their cleverness. Those who have been dismissed, or who have been "allowed to resign"—like the cat's paw in the first great Naval attack on the R.A.F.—were cancers in the body of the Service so long as they remained and it is well rid of them.

As the result of the weeding-out process the R.A.F. is better and stronger than it has ever been. Some few weeks ago in Egypt one of one's friends met the Belgian Air Attaché, the Chevalier Willy Coppens, one of the most experienced and most decorated of air-fighters on the West front in the War. M. Coppens had just returned from an air tour in Irak and had seen the R.A.F. at work there in all its manifestations. In consequence he was full of enthusiasm for the efficiency of the Air Force. He said emphatically that it was the smartest fighting force he had ever seen and that its organisation was wonderful. Such a tribute from a fighting man of his experience is well worth having.

Unfortunate Incidents.

Of course set-backs will occur at times, and at the most inopportune times. For example the following story, which is more or less authentic.—It is said that when Sir John Salmond was passing through Egypt on his way to India a grand tamasha of the Air Force was held to which all the notabilities of or in Egypt were invited. All went well till a big troop-carrier was sent up after publicly embarking twelve fully-equipped infantrymen with tin hats, rifles and a machine-gun, to demonstrate to the assembled company how air transport can be used to quell local disturbances.

The machine started gaily and rose easily to some thousands of feet, what time the impresario of the proceedings explained that on its descent the infantry would come smartly into action. In due course the machine made a perfect landing right in front of the enclosure, the door opened, and for some minutes a chilly silence reigned while nothing happened. Then there emerged, minus tunic and equipment, one solitary figure which crawled out of the door, leaned against the side of the machine and continued to be violently ill. The local disturbances had utterly conquered the other eleven.

There was also the sad story of the "F.-boats" at Malta when the Admiral commanding the Mediterranean Fleet entrusted himself to the air. One boat elevated the Admiral, a second took up his Chief-of-Staff, and a third the O.C. local R.A.F. That including the Chief-of-Staff suffered from engine failure and alighted without damage. That in which the Admiral was being educated also suffered from engine failure, came down in a heavy sea, decomposed itself considerably and sank: thus giving the Admiral rather more than he expected of an insight into the manners and customs of the R.A.F. The only boat which remained aloft was that of the O.C. R.A.F.: which was pure joss, seeing that he had deliberately chosen the least popular of the three.

Nevertheless the continued good work done by the R.A.F. in the Middle East, the regularity with which the mails are run to and from Baghdad, and the general good behaviour and efficiency of the Air Force in the Near East is sufficient to have overcome any evil effect produced in the military and official mind by such lamentable exhibitions. The fact remains that since the R.A.F. took over Irak under Sir John Salmond there has been far less trouble with the predatory tribes than there was before. And the "Hunnish Methods" about which the *Daily Herald* has been bleating so loudly of late, because a few bombs have been dropped on troublesome

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villagers, have proved much cheaper for both sides and much more effective from our point of view than any amount of punitive expeditions.

In India the famous "R.A.F. Scandal," which was caused by the Indian Government's meanness in 1920-21, has been cured in 1922 and the R.A.F. has acquired not only new equipment but a new Air Officer Commanding who certainly cannot be surpassed for ability as an administrator or for knowledge of staff work. And despite the inefficiency with which the R.A.F. in India has been handled in the past few years the few old decrepit machines available have done more to keep the King's Peace on the Frontier than has the whole of the Indian Army put together.

In the very uncomfortably Near East the R.A.F. has done most valuable work. The squadrons which were sent to Constantinople and to Gallipoli have had a most salutary effect in abating the truculent attitude of the Turks. Sir Charles Harington, one of our ablest soldiers, has borne witness to the high moral and discipline of the R.A.F. personnel under his command. And R.A.F. seaplanes operating over the famous Chanak area have done more to preserve the integrity of the so-called "neutralised zone" than have all the Allied Armies. After that little incident of the transport column during the Turkish retreat in Palestine soldiers of all ranks in the Turkish Army are apt to think rather highly of R.A.F. craft, and to the uninitiated a seaplane float looks uncomfortably like an out-size in bombs.

R.A.F. Personnel.

At home the R.A.F. is also showing remarkable progress. The new Staff College is training in the right way a number of excellently chosen young officers to do precisely the work for which at present—as was bound to be the case—hardly any officers are available. The cadets coming through from Cranwell are of the right type and have acquired from their Commandant and his able staff that *esprit de corps* combined with the proper Service outlook which is the breath of life to any Service.

The Short Service officers are on the whole very good. And they would be better still if their chances of winning permanent commissions were made a little clearer to them and if they could be assured that they would be promoted on seniority *and* merit rather than by luck and favour.

The boy-mechanics from Cranwell and Halton are really good stuff and will do well when they have served for a few years with squadrons. The men from Halton and Manston are good on the average, but they might be better and some are rank bad. This was only to be expected seeing that they were all grown men when enlisted, that most were civilians who were too young for the Army during the War, and that some had dodged the trenches by being so-called "skilled workmen" in factories. These civilians acquired bad habits in workshops and some who only enlisted in the R.A.F. because they could not get work elsewhere are either frankly Bolshevik or at any rate are not amenable to discipline.

Nevertheless the great majority of the "Other Ranks" in the R.A.F. to-day are keen on the Service and smart in appearance and are moreover enthusiastic believers in the future of flying. It is true that the men whom one sees at the R.A.F. Pageant or at air race meetings slaving over the machines flown by R.A.F. officers are picked volunteers, but one believes that when volunteers for such work are required the majority of the air mechanics at the station concerned put in for the job, and that those who actually appear on these occasions are not the exceptions but rather are typical of the rest of the personnel.

One's friends in the R.A.F. in Irak and in India are enthusiastic about the splendid way in which the "Other Ranks" stick to their work under almost impossible conditions. Think of assembling an aeroplane or installing in a corrugated iron shed with the thermometer at 120° Fahrenheit *inside* the shed. Or of repairing a damaged machine on the open desert in the sun several degrees hotter. And yet the men do it and retain their enthusiasm. Truly the Englishman is an undefeatable animal.

The R.A.F. and the Navy.

The whole future of the R.A.F. is not yet assured, for there is still a strong party in the Navy which is bent on wrecking the R.A.F. and getting the sea-going part of it completely under the Admiralty. During 1922 the Air Ministry has come out well on top in its battles with the Admiralty. But it must beware of compromises in 1923.

One has seen it suggested in an R.A.F. station magazine that one way out of the difficulty is to second R.A.F. personnel to the Navy when serving with the Fleet (or presumably when co-operating with the Fleet, for one could not have say the R.A.F. personnel in *Argus* or *Ark Royal* seconded while serving in the Mediterranean and the personnel at Malta still purely R.A.F.). This is a most dangerous suggestion, for as soon as R.A.F. personnel were allowed to get into sloppy Naval uniforms they would get into sloppy Naval habits, and away would go the *esprit de corps* and efficiency of the R.A.F. It would be the thin end of the wedge towards giving the sea-going R.A.F. to the Navy and that would almost inevitably mean losing the command of the seas in the next war.

Meantime it must be remembered that during 1922 the Air Ministry has spent far more money on producing new experimental aeroplanes for Naval co-operation than it has on machines for Army co-operation and pure Air Force work together. The amount of money spent on fleet-spotters, deck-fighters, torpedo-carriers and so forth is enormous compared with that spent on troop-carriers, long-range reconnaissance machines, heavy bombers, or single-seater or two-seater fighters. The Navy is fairly obviously incompetent to protect itself. And nobody can accuse the Air Council of being blind to the need for protecting the Navy both against enemy action and against its own stupidity.

Army Co-operation.

The long-suffering British Army has not been so well treated by the Air Council as has the Navy in the matter of machines, but one gathers that co-operation between the Army and the Air Force is much closer and more cordial than between the Navy and the R.A.F. Which is only natural when one realises how much more the average soldier has seen of war than has the average sailor and how much more a soldier's life and education tend towards an intelligent appreciation of new weapons and methods than do those of a sailor.

The Army co-operation units of the R.A.F. have worked hard during 1922 and have produced excellent results. And wherever the R.A.F. has had to co-operate with the Army on active service the results have been excellent. There are still some people in the R.A.F. who want the land-going side of the Air Force to go back to the Army and there are still some people in the Army who want it back. But doubtless this feeling will die a natural death in due course, even in Irak and Palestine where for lack of trained R.A.F. officers the Air Force has had to borrow Army officers wholesale for Staff and administrative duties.

The Best All-Round Air Force.

Taking it all round the R.A.F. is in a far better state than the Nation or the Government has any right to expect it to be considering how it has been starved for money. Be it remembered that the two new capital ships just ordered for the Navy cost more than the whole vote for the Air Force put together, despite the fact that one squadron of the R.A.F. could put one of these ships out of action in half an hour, and probably both of them.

One believes firmly that in the event of a sudden war we could to-day put the biggest air force in the World into the air. We could certainly produce the most efficient air force. And, knowing something of the experimental machines which are coming through, one is certain that in six months after the outbreak of war we should have an adequate supply of aeroplanes and engines and equipment far superior in quality to those of any other nation.

For this satisfactory state of affairs we have to thank largely Mr. Churchill, the rejected of Dundee, who has since 1911 been the one Cabinet Minister who has devoted adequate attention to developing our Air Power. Also we have to thank Captain Guest and Lord Gorell who throughout 1922 have fought the Air Ministry's battles so honestly and so strenuously in Parliament. It is a strange commentary on mob psychology that an electorate which had the collective sense to throw out Mr. Lloyd George's crooked Government should have re-elected him personally and should have rejected two of the most honest and able men in that Government, the very two men who have done more than any other Members of Parliament to build up and maintain that Air Power on which the whole future of England must depend.

As a matter of fact both of them have suffered for their honesty in remaining loyal to their unworthy chief. If they had gone back on Lloyd George they would have gone back into Parliament. One respects their honesty and hopes that now they have satisfied their honour by going down with his sinking ship they will come to the surface independently and again appear in the House to do good work for aviation.

A Benevolent Despotism.

On the militant side of aviation naturally everything has depended on the benevolent despotism of the Chief of the Air Staff. The time always finds the man and the present time still needs Sir Hugh Trenchard. Some day the Air Force may become a damned democracy governed by committees and conferences. But committees and conferences, even of the most intelligent, could never have pulled the R.A.F. through the recurrent crises of 1922. It is a matter for thanksgiving that the Air Chief Marshal should have recovered from his severe illness of 1921 so completely as to have been able to accomplish the astounding amount of work which he has done during the past year.

Perhaps the strongest evidence of the power of his personality is the fact that through all the vicissitudes of the

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past four years he has retained the respect and affection of the officers and men under him as fully as he held it during the War. It is so much easier to lead men in war than it is to govern them in peace. Even those who a year ago were doubtful about the future of the R.A.F. have now come to believe in it, thanks to the victories won by the Chief of the Air Staff against Naval intrigue, the "Geddes Axe," internal disloyalties, and the King's enemies.

The changes in the Air Ministry during the year have been all to the good. Sir Geoffrey Salmond as Controller-General of Supply and Research has already shown that he is not merely a new broom but a constructive critic of more than ordinary ability. He knows what the R.A.F. wants and he is seeing that it gets it. The sweeping-out of minor departments is not perhaps quite complete, but what has already been done has got rid of many incompetents and has shaken pretty badly some who thought they had cushy jobs for life. Here and there perhaps the wrong man has got in the way of the broom, but on the whole the effect has been quite salutary. And happily under the new régime the militant and the technical side work together in more complete harmony than has hitherto been known.

In fact, taking it all round one can safely say that 1922 has been a year of great progress for the R.A.F. and that it has opened the way to still greater progress in 1923, provided that the new Secretary of State, Sir Samuel Hoare, can persuade his tranquil Premier that the best insurance of tranquility is adequate preparation for war.—C. G. G.

[NOTE :—It is proposed next week to deal with the Trade

of tranquility is adequate preparation for war.—C. G. G.

THE KING'S SECOND CUP.

His Majesty the King has been graciously pleased to notify to the Royal Aero Club that he will present another Cup for an air race round Great Britain this year.

This mark of continued Royal interest in the sport of flying should assist very materially the growth of genuine sporting aviation. It is to be hoped that the Committee of the Royal Aero Club will take suitable steps to encourage true sport.

Definite rules should be laid down to avoid such incidents as gave rise to so much argument last year. It should be clearly understood that competitors who start before the flag falls will be disqualified and that machines must not be materially altered in the course of the race. Also it should be laid down that machines which are operated with the help of Government subsidies or are even repaired or tuned-up in subsidised workshops by subsidised labour are ineligible for the race.

In other words the race should be so arranged as to encourage sportsmanship, whether it be on the part of firms or of individuals. The aim should be to encourage the production of new or specially rebuilt machines for the race and not the production of a "review of ancestors."—C. G. G.

BRITISH DESIGNS IN THE U.S.A.

The Air Ministry states that the Royal Commission on Awards to Inventors and the American Commission for the Adjustment of Foreign Claims will, at an early date, sit jointly to decide claims for awards in respect of the communication to or the use by the Government of the United States of British designs of aircraft, engines and accessories.

Mr. Justice Sargant and Lieut.-Col. McMullen, respectively Chairmen of the two Commissions, sat on December 20th, at the Law Courts to hear an application by the Attorney-General for directions as to the course of procedure. They decided that no claim should be considered unless the applicant had before January 11th, 1923, signed an agreement to refer the matter to the arbitration of the Joint Commission.

Forms of such agreement and all other information can be obtained from the Secretary (S.g.C.), Air Ministry, W.C.2.

Claims are strictly confined to those in respect of British designs of aircraft and their engines and accessories which were communicated to or used by the Government of the United States during the war.

RELATIVE STRENGTHS.

The Air Ministry has placed at the disposal of the Press copies of answers to question No. 72 by Lieut.-Com. the Hon. J. M. Kenworthy, M.P. (Hull, Central) on Dec. 14th and to question No. 75 by Major C. R. Attlee, M.P. (Limehouse), on the same date, which were sent on Dec. 22nd to the honourable and gallant members by Lieut.-Col. the Rt Hon. Sir Samuel Hoare, Secretary of State for Air.

Question No. 72. LIEUT.-COM. KENWORTHY.—To ask the Secretary of State for Air if he will state the relative strength of the Air Force stationed in Europe of Great Britain, the French Republic, and the kingdom of Belgium; whether he san state the relative numbers of fighting, spotting and bombing machines respectively of modern construction and fit for service maintained in Europe by these three Powers, and what are the numbers of trained pilots, observers and mechanics respectively maintained by these three Powers in Europe on the active list

Answer. SIR SAMUEL HOARE.—This question falls into three parts :—

1. *The relative strength of the Air Force stationed in Europe of Great Britain, the French Republic and the kingdom of Belgium.*—The strength of the Royal Air Force at present stationed in Europe, including units temporarily in the Constantinople Area, is approximately 15 squadrons, that of the French Air Service 100 squadrons and that of the Belgian 14. The average establishment of the British squadrons is, however, 12 machines, whilst that of the French squadrons is 9 and that of the Belgian 10.

2. *The relative numbers of fighting, spotting and bombing machines respectively of modern construction and fitted for service maintained in Europe by these three Powers.*—The total number of British Active Service Air Squadrons is 32, of French active squadrons 120, of Belgian active squadrons 14, the average number of the aeroplanes being as given above. It would not be advisable in the public interest to give the total number of British aeroplanes of each type which are of modern construction and fit for service, and, so far as is known, the Governments of France and Belgium have not made public similar information in regard to the French and Belgian Air Services

3. *The numbers of trained pilots, observers and mechanics respectively maintained by these three Powers in Europe on the active list.*—There are on the strength of the Royal Air Force in Europe at the present time 1,158 trained pilots, 75 observers and 19,421 other ranks employed on ground duties. These figures include personnel employed at Flying Training Schools, Depots and other miscellaneous establishments. In the current French "projet de loi" provision is made for the maintenance in Europe in 1922 of 3,039 flying personnel and 30,477 other ranks employed on ground duties. The second of these two figures is, however, misleading, since a large number of the personnel employed on ground duties in connection with the French Army Air Service (for example, personnel for wireless, recruiting, transport, works, provision of rations and clothing, medical services, etc.) are found from the Army and are not included in the foregoing. This personnel is not budgeted for separately or otherwise distinguished from Army personnel generally, and it is therefore impossible to assess their numbers with accuracy. This consideration also applies in the case of the French Naval Air Service. Figures are not available to classify the flying personnel as pilots or observers. The Belgian Army, including the Air Service, is at present in process of reorganisation, and, pending completion of this reorganisation, accurate figures for air service personnel will not be available Prior to reorganisation the approximate total *establishment* was 2,000 all ranks, but this figure is subject to the qualifications made in the preceding paragraph in regard to the personnel of the French Army Air Service.

Question No. 75. MAJOR ATTLEE.—To ask the Secretary of State for Air if he will state the total number of military and civil aeroplanes built and building in France, in French possessions and in European territory occupied by France, the number of squadrons, the number of aircraft in each squadron and the number and weight of explosive and chemically charged bombs carried by the latest type of French fighting plane.

Answer. SIR SAMUEL HOARE.—This question falls into four parts :—

1. *The total number of military and civil aeroplanes built and building in France, in French possessions and in European territory occupied by France.*—Exact figures are not available as to the war stocks of aircraft held by the French Government. It is therefore impossible to give a figure for the number of military and civil aeroplanes built; the number on the Civil Register, however, on December 1st was 660. As regards the number building, according to the latest information available French aircraft manufacturing firms have produced 3,300 machines for civil or military purposes during the first 11 months of the current year, making a monthly output of 300 machines. This figure includes aircraft built for export to foreign countries.

2. *The number of squadrons.*—The total number of squadrons at present maintained by France is 128.

3. *The number of aircraft in each squadron.*—The normal establishment of machines held by a French squadron is 8 or 10, according to type.

4. *The number and weight of explosive and chemically charged bombs carried by the latest type of French fighting plane.*—The French Government have not, so far as is known, made public any particulars as to the number and weight of explosive and chemically charged bombs carried by their latest types of aircraft.

THE ARRIVAL OF A RIVAL.

Herr O. J. Merkel, President of the German Aero Union and two other directors of the Deutsche Luft Reederei arrived at Croydon on Monday in an all-metal Dornier C.3 monoplane fitted with a 185 h.p. B.M.W. engine. The machine left Berlin on Thursday and landed near Lympne on Sunday owing to fog. It arrived at Croydon on Monday morning.

The Directors are guests of the Daimler Airway with whom they are concluding arrangements to operate a London-Berlin Air Service.

All interested in British and German Aviation are hoping that the Governments concerned will do the right thing and will abolish the absurd restrictions on German aircraft construction, which have not quite had the effect which those who formed them intended that they should have.—G. D.

A NOTABLE EVENT.

Members of the Royal Aeronautical Society and others interested in aircraft design are reminded that Doctor Junkers the famous German engineer is lecturing to the Royal Aeronautical Society at the Royal Society of Arts, John Street, Adelphi, at 17.30 hours to-morrow, Thursday, January 4th.

It is probable that there will be a big demand for seats and therefore would-be visitors who have not already procured tickets will do well to obtain them forthwith from the Secretary of the Royal Aeronautical Society, 7, Albemarle Street, W.1.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

In a note which is published below the Technical Editor is cheerfully pessimistic concerning technical progress in aeronautics in England during 1922.

———

The new Rolls-Royce "Eagle IX" engine is described and illustrated in this issue. This engine, which is a new variant of the well-known "Eagle VIII," contains alterations and simplifications which should allow it to improve upon even the record of its famous predecessor.

1922.

Editorial habit dictates that some portion of the very limited space which is available in this paper should, in the first issue of the New Year, be devoted to some sort of a review of the preceding twelve months. Any such review must necessarily be largely concerned with actual events, and from the technical point of view events—even when comparatively new—are usually only the exploitation of ancient ideas. A very fairly complete schedule of such events may be found in another part of this paper.

In technical matters 1922 has followed in the footsteps of previous post-war years. British aircraft constructors have continued to build various modified versions of the type of tractor biplane originated in 1910 by Mr. A. V. Roe. True to the characteristics of the British, having discovered a type of apparatus which does work, they have elaborated, perfected, and enlarged it, have built it of various materials and adapted it for manifold purposes with remarkably successful results. And as a result British aeroplanes of to-day are undoubtedly the most efficient and the safest in the world. This would be a highly satisfactory state of affairs were it reasonably certain that the super-Avro is a type of aircraft fit to be standardised.

Outside of manufacturing circles however there have been distinct signs of life. Even in England those whose business deals with the scientific aspects of aeronautics have shown signs of realising how profound is their ignorance, and that in certain respects seekers after knowledge of the less self-satisfied races had advanced beyond them.

And therefore there is now in this country a certain body of opinion which holds that it is possible to arrive at something approaching a science of aeronautics, and that further knowledge will allow us to improve the aeroplane to an enormous extent.

The very high degree of mechanical perfection to which the English manufacturer has brought the present standard type of biplane may—almost certainly will—oppose a serious obstacle to the practical realisation of such hopes, so far as this country is concerned. Doubtless the English constructor will follow the English aerodynamicist's example and wait until the less hide-bound habits of the foreigner permits him to leap ahead in the matter of aerodynamic design.

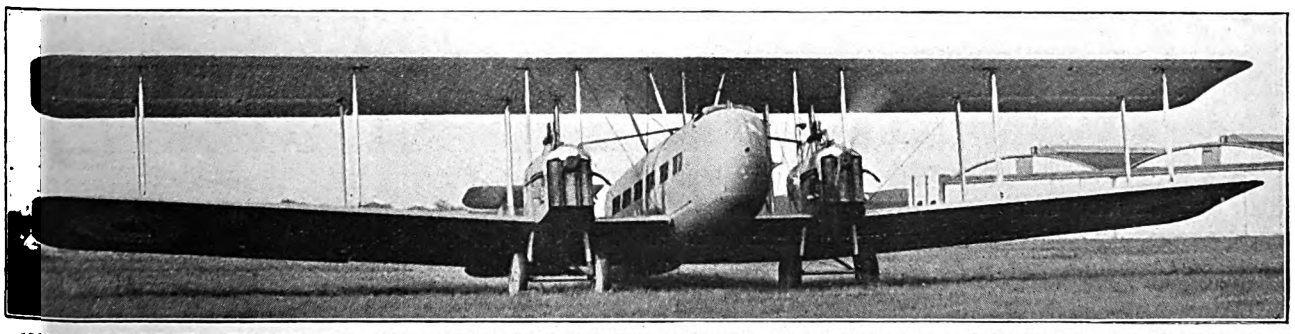
However this may not be altogether disastrous. There is strong reason to believe that certain foreign machines are already aerodynamically well ahead of anything English, but that their faulty mechanical details, and above all their inferior engines, render them practically less useful machines. If the English manufacturer has the sense—as he generally has—to use the good points of his rivals' designs and to adapt to them his superior craftsmanship British aircraft will be able to retain their leading position.

But even to achieve success in this somewhat Japanese manner requires an intelligent appreciation of the technical work of foreign rivals, which is barely discernible in the British Aircraft Industry to-day. One hopes that this lack of appreciation is merely an inertia effect—but when the Editor of the leading aeronautical journal of this country, knowing nothing whatever about Jukowski, devotes nearly a page to pouring obloquy upon him because he (the Editor) dislikes the sound of his (Jukowski's) name, one cannot but fear that it may be due to some more serious cause.

However it has to be realised that reviews of British Industry regarded from the purely technical aspect always have presented a melancholy aspect, but that the high standard of English craftsmanship has hitherto sufficed to compensate for the technical somnolence characteristic of the country. So far as this matter of craftsmanship is concerned the British Aircraft Industry—aided and abetted by the Air Ministry—maintains its long lead over all the rest of the world.

In such matters as that of providing adequate strength, comfort for passengers, safety against fire and the like no aircraft can compare with those produced in this country. For these matters one has largely to thank the Air Ministry—though there be many who think that the Air Ministry has imposed undue handicaps on the designer by the severity of its regulations.

In regard to metal construction England has nothing to learn from her rivals—except perhaps the desirability of preserving a slightly more open mind in regard to the possibilities of aluminium and magnesium alloys, and in the matter of engines and engine installations the world has much to learn from England.—W. H. S.



1922's LARGEST AEROPLANE.—The Vickers "Victoria" (2 Napier "Lion" engines), built for the Air Ministry as a troop-carrier, and designed to carry 23 fully-equipped infantrymen.

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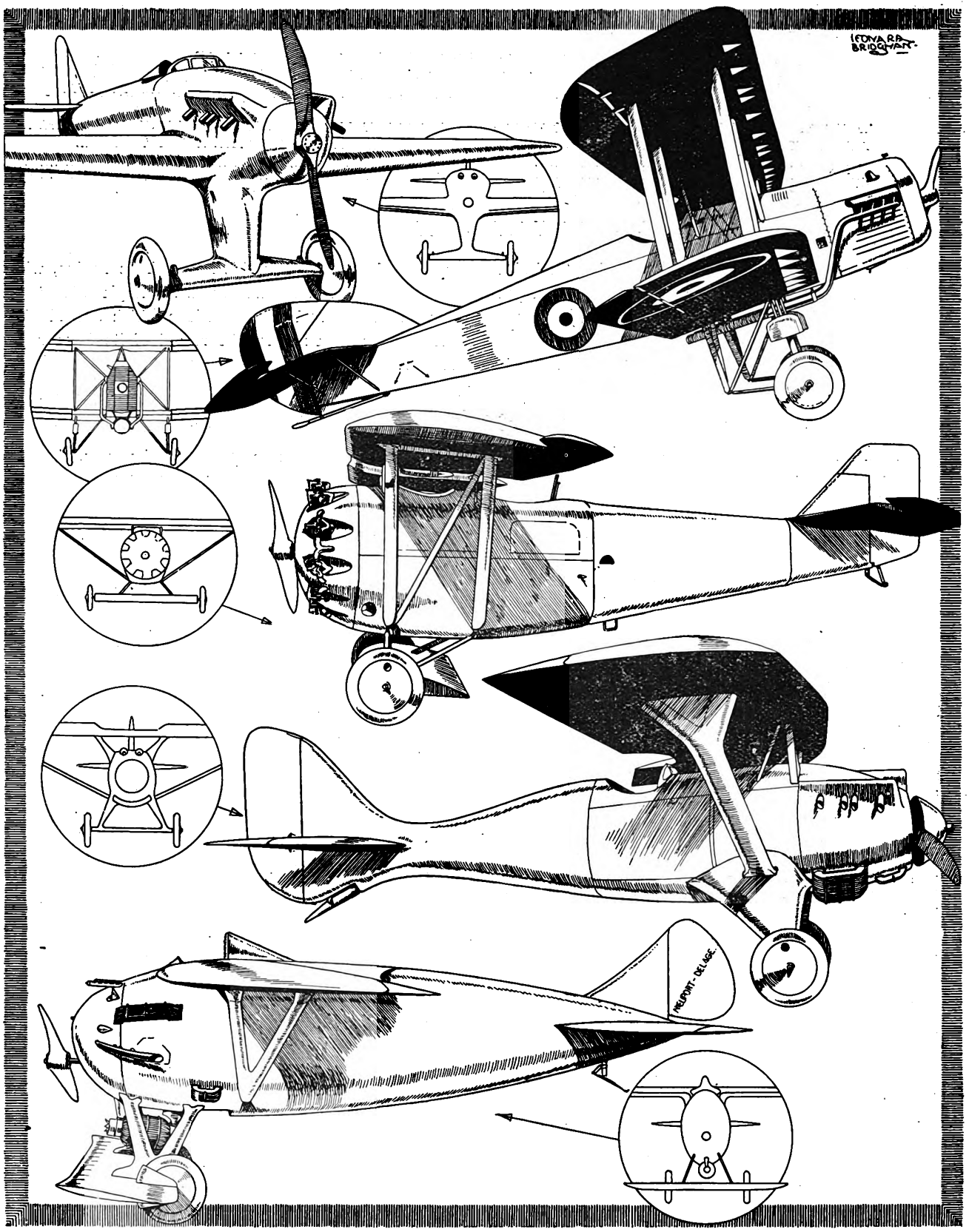

FROM THE PARIS SHOW.—A selection of the most interesting machines which illustrates the growing tendency on the part of enterprising designers to depart from the tractor Bip lane type which has been the standard of the past 10 years. Top, left, the all-duralumin Bernard single-seater with the inverted T undercarriage. Top, right, the Handley Page "Hanley" torpedo carrier (450 h.p. Napier "Lion") with slotted wings and slotted ailerons. Below, in order, the Koolhoven F.K.31 two-seat fighter with the Bristol "Jupiter" engine, the Buscaylet-deMonge duralumin single-seater, and the Nieuport-Delage type 37C.1 "Sesquiplan" high altitude fighter.

Attached to each sketch is an outline front elevation of the central portion of the machine.

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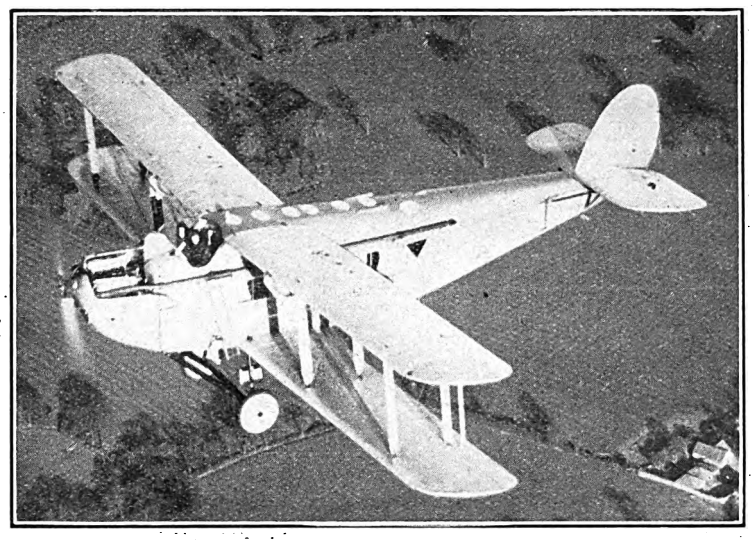
THE DH 34



"The D.H.34 has shown itself to possess in a very high degree the desirable attributes which were aimed at in its design. It has shown itself to be abnormally reliable and safe, and it is fairly generally admitted by passengers of experience to be the most comfortable passenger-carrying machine in regular commercial service."—*The Technical Press.*

The Record of G-EBBS.

An example of the regularity and efficiency which can be obtained with a modern aircraft operated in a well-organised commercial service is furnished by the record of D.H.34 G-EBBS (450 h.p. Napier "Lion" engine), belonging to the Daimler Hire Ltd., while operating on the London-Paris Service.

This machine, built by the De Havilland Aircraft Company Ltd., made its first trip between London and Paris on April 13th, 1922, and from that date until October 7th, 1922, inclusive, it carried out 332 single trips over the route of 240 miles—a total distance of about 79,700 miles, and, in addition, made a trial flight to Berlin and back.

It was actually employed on **127** days out of a possible **165** days (8 days were spent on the visit to Berlin and 5 days on Air Ministry tests, etc.) and therefore accomplished an average of **2.6 single trips per day employed** or 2.0 single trips per day in service.

On 45 days the machine performed four trips over the route.

As at the expiration of this period the machine, after more than 700 hours of flying, was in excellent condition and has since remained in active commission, the fallacy of the idea, still common, that the life of an aircraft is limited to about 200 flying hours is clearly proved. The confidence one put in this idea is shown by the fact that even to-day the system of granting State subsidies in certain other countries assumes a life for aircraft of only 200 flying hours.

This record is highly creditable to the constructors of the aircraft and engine and to the operating company. It is a demonstration of the progress achieved in the design of machines and of the efficiency of the methods employed in organising the air line from which one can gauge the high degree of safety, reliability and economy now possible in air transport.

The chief factor which has contributed to this state of affairs is the system adopted of inspection and maintenance of the machines, by which defects in running and signs of wear are discovered in the early stages and eliminated before any serious trouble arises. In actual practice, the system is such that no wear of working parts, or any chance of breakdown, however remote, that can be foreseen and guarded against, is permitted to exist, and the machines never fly unless, after thorough inspection, they are certified as airworthy in every detail.

Not only is the record of this machine a tribute to the individual companies concerned, but it sets up a standard that confirms the claim of the British aviation industry to lead the world.—*Official Air Ministry Report.*

THE DE HAVILLAND AIRCRAFT CO., LTD.,

STAG LANE AERODROME,

EDGWARE, MIDDLESEX.

Telegrams: "HAVILLAND, EDGWARE." **Telephone:** "KINGSBURY 160, 161."

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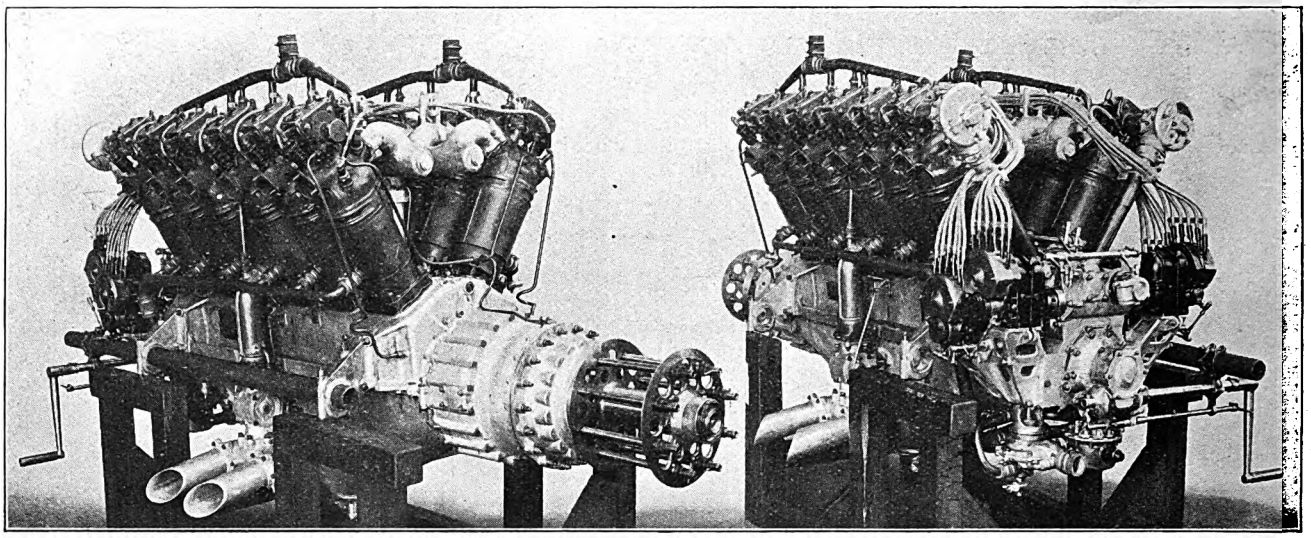
THE ROLLS-ROYCE "EAGLE IX" AERO ENGINE.



The Rolls-Royce "Eagle" engine was originally produced early in the war, and has probably a longer record of continuous development and useful service than any other aero engine. The first "Eagle" engine was produced in 1915, and the R.R. policy of persistent attention to detail and continuous development has been consistently applied. It has always been the policy of the designers to place reliability first, as in their opinion it is the most essential feature in aviation

After a considerable amount of practical experience in the air, followed by much experimenting and testing, a new and greatly improved "Eagle" engine has been developed and put into production. Owing to the many improvements which are incorporated in the design of this latest model it entirely eclipses the "Eagle VIII" which was designed primarily for fighting purposes.

The new model, known as the "Eagle IX," has been designed to be equally suitable for both peace and war, and amongst others has the following advantages over the out-of-date "Eagle VIII":—

1. In order to obtain simplicity and other advantages, two carburetters are fitted (in place of four). These carburetters are low down on the centre line of the crankcase. The substitution of two carburetters in place of four considerably facilitates engine tuning and combined with the new induction system improves distribution of the mixture to the various cylinders.

2. In order to permit gravity feed to be used in as many cases as possible, the float feeds have been redesigned, and the engine will now function satisfactorily with a head of petrol only 8 inches above the centre line of the crankshaft.

3. The danger of fire has been considerably reduced by certain alterations in the design of the carburetters.

4. Other alterations in design have resulted in particularly smooth running of the engine without rough spots, and it is easy to maintain the running of the engine in this condition.

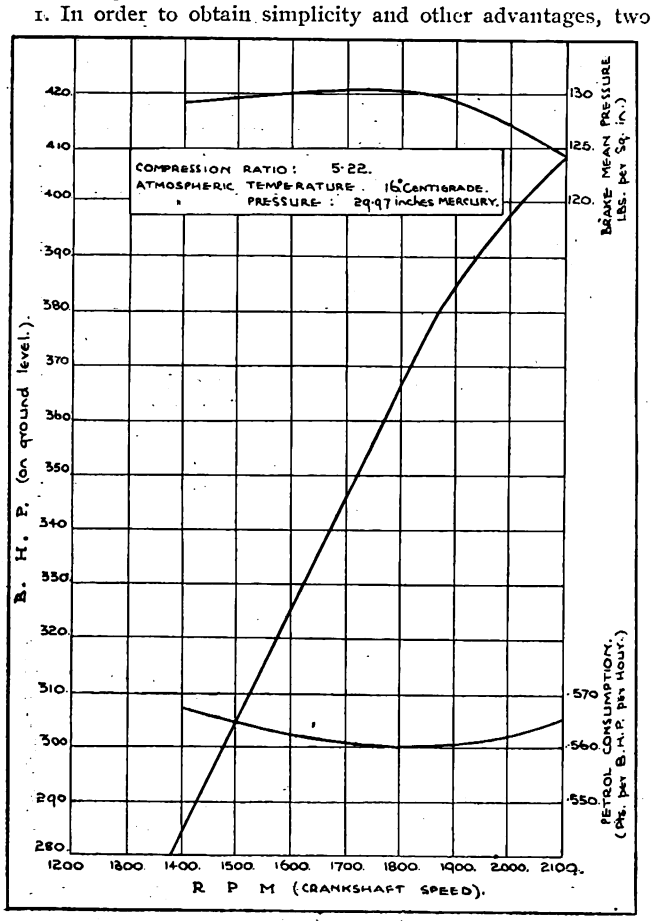
5. The design has been modified in details, in order to provide increased strength or wearing qualities wherever experience has shown that the improvements could be effected.

The photographs reproduced herewith show the completeness of the new engine, and that every detailed requirement for installation has received attention in the design. In the rear view can be seen the lay shaft, to which all the controls are led, thus making the installation and changing of engines a simple matter. The hand-turning gear can also be seen. The handle is easily changed over to whichever side of the engine is most accessible, and if desired chain-wheels may be used to bring the handle-shaft down to any position required. In the photographs the ignition is shown with the magnetoes completely screened, and with metallic-armoured ignition wires, supplied when it is desired to use the engine in a machine fitted with wireless gear.

Rubber connections in the petrol feed have been entirely done away with, and the amount of piping reduced to a minimum.

The accompanying H.P. Curve is the average obtained from production engines as they are now leaving the works.

A number of redundant "Eagle VIII" engines were in the possession of the British Government at the end of the war, and it is believed that these have now nearly all been disposed of, directly or indirectly, to foreign nations, etc. It is expected therefore, that there will be in future a large demand for the new "Eagle IX" engines by those who are building new aircraft and require the most efficient and up-to-date engines available.



Power Curve of the Rolls-Royce "Eagle IX" Engine.

A CLAIM FOR THE BRISTOL FIGHTER.

The Royal Commission on awards to Inventors on Monday December 11th considered a claim made by the Bristol Aeroplane Co. Ltd., in regard to the introduction of the "Bristol Fighter."

Counsel for the claimants related how the "Fighter" was designed early in 1916 by Capt. Barnwell. The machine was an immediate success, and because of its manœuvrability and high performance it enabled British pilots to meet and overcome the enemy Fokkers. 3,515 of these machines were built and delivered by the Bristol Company, but their claim was in respect to 1,827 machines of the same design built by other firms from the Bristol Co.'s designs.

Counsel for the Crown agreed that the design was meritorious, but submitted that much of the usefulness of the machine was attributable to the high performance and low weight of the Rolls-Royce engines fitted to it.

The decision of the Commission was reserved.

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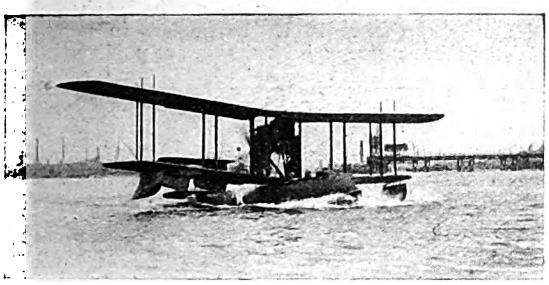
SUPERMARINE

ENGLAND.

DESIGNERS AND CONSTRUCTORS OF NAVAL FLYING BOATS AND NAVAL AMPHIBIAN FLYING BOATS.



"CHANNEL TYPE" SCHOOL MACHINE.
240 H.P. Puma.

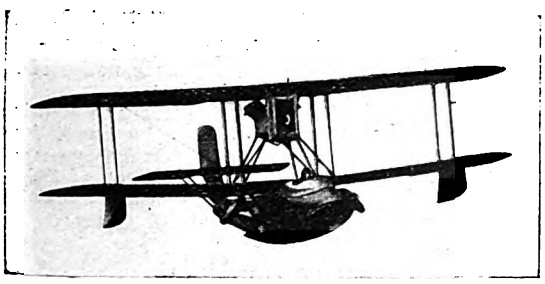
SUPERMARINE "CHANNEL TYPE"

Naval School and Training Flying Boat for Training in Flying, Seamanship, Wireless, Bomb Dropping, Gunnery and Navigation.
As adopted by many
FOREIGN NAVIES AND GOVERNMENTS.

"SEAGULL" AMPHIBIAN MACHINE.
450 h.p. Napier Lion.

SUPERMARINE "SEAGULL"

Fleet Spotting Amphibian Flying Boat. Two Gun General Services, Deck Landing Machine, designed specially for reconnaissance, gun and fleet spotting duties.
As adopted by
THE BRITISH AIR MINISTRY AND FOREIGN NAVIES.



"SEA LION II" SINGLE SEATER AMPHIBIAN.
450 h.p. Napier Lion.
Winner of the International Race for the Schneider Cup at Naples, August 1922.

SUPERMARINE "SEA LION II"

Naval Scout Amphibian Flying Boat. Single Seater General Fighting Scout Machine.

THE
FASTEST MARINE MACHINE
IN THE
WORLD. 163 M.P.H.

SUPPLIED TO
H.M. Admiralty, H.M. Air Ministry, The Imperial Japanese Navy, The Royal Norwegian Navy, The Royal Swedish Navy, The Chilean Navy, The Portuguese Navy and other Foreign Governments.

Designers and Builders of the Challenger and Winner of the
INTERNATIONAL SCHNEIDER CUP
At Naples, August, 1922,
ESTABLISHING NEW WORLD'S RECORDS
For Marine Aircraft.

We have been entrusted by the British Air Ministry with the design and construction of the LARGEST FLYING BOAT ordered by them since the war. Also with the design and construction of the first DOUBLE-ENGINED AMPHIBIAN FLYING BOAT to be ordered in the British Empire.

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A GERMAN AEROPLANE WITH A BRITISH ENGINE.

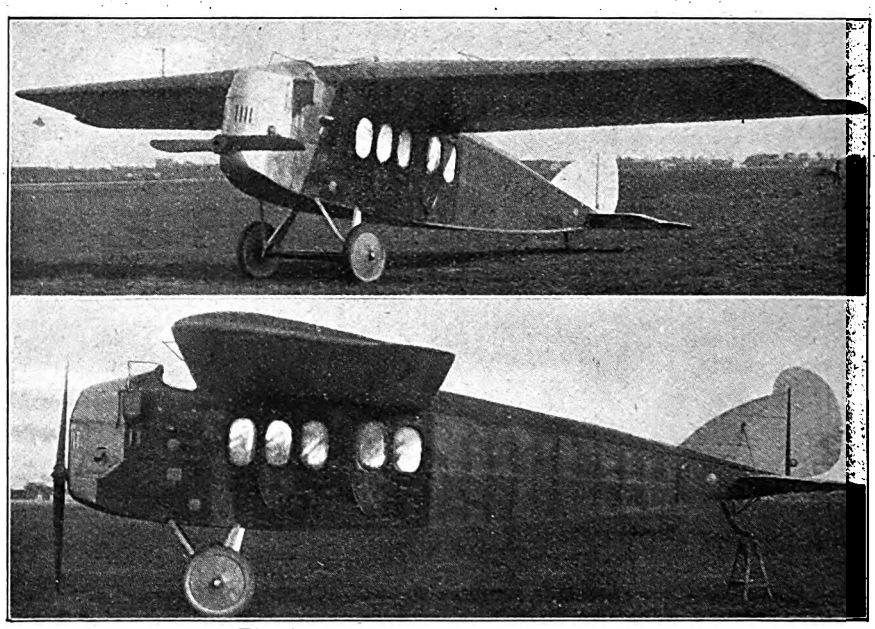
The machine shown in the attached photograph is a modification of the Albatros L.57, a scale drawing of which was published in The Aeroplane during 1920. As far as can be discovered the L.57 was never completed, probably owing to the difficulty of procuring a suitable engine in Germany. In the present machine this difficulty has been overcome by the use of a Falcon Rolls-Royce engine of 240 h.p. The machine is a six-passenger cantilever monoplane built of wood and three-ply covered. The wing which has a maximum thickness at the roots of 0.6 m. (2 ft.) is built in three sections, a centre section and extensions. Large ailerons with a balancing projection are fitted.

The cabin is arranged to be almost entirely under the wing, thus keeping the passenger load close to the C.G. and in consequence the machine is in good trim with all loads.

The pilot is seated just ahead of the leading edge, with his feet extending forward over the engine, which is very completely enclosed. Petrol tanks and luggage are carried in the wing.

Specification of the Albatros L.58.

Span .....14 m. 19 (46 ft. 7 in.).
Length .....10 m. 35 (34 ft.).
Wing surface ...34.5 sq. m. (372 sq. ft.).
Engine .....Rolls-Royce Falcon 240 h.p.
Weight empty .....1,180 kg. (2,596 lbs.).
Total load .....880 kg. (1,936 lbs.).
Weight loaded .....2,060 kg. (4,532 lbs.).
Wing loading .....59 kg. per sq. m. (12.2 lbs. per sq. ft.).
Power loading .....7.48 kg. per h.p. (10.8 lbs. per h.p.).
Endurance .....4 hours.
Speed .....160 km.h. (100 m.p.h.).
Climb to 2,000 m. (6,560 ft.) ...25 mins.



The Albatros L58 (Rolls-Royce "Falcon" Engine).

THE THIRD AIR CONFERENCE.

It is now announced that the Third Air Conference will be held by kind permission of the Corporation of the City of London in the Council Chamber at the Guildhall on Tuesday and Wednesday, February 6th and 7th, 1923.

On Tuesday the Chairman of the morning session will be the Secretary of State for Air, Lieut.-Col. the Rt. Hon. Sir S. J. G. Hoare, Bart, C.M.G., M.P. (subject to the Government surviving until that date). Sir Sefton Brancker, K.C.B., A.F.C., will read a paper on "The Position of Air Transport To-day," which if it be based on the amount of air transport of the previous three months ought to be very short, and Commander C. D. Burney will read a paper on "A Self-Supporting Airship Service," concerning which one need only remark that one would imagine that the airships of any service would have to be self-supporting.

At the afternoon session the Chairman will be Sir Henry P. Maybury, K.C.M.G., C.B., President of the Institute of Transport, when three technical papers will be read, one on "The Progress of Research and Experiment" by Air Vice-Marshal Sir Geoffrey Salmond, K.C.M.G., C.B., D.S.O., one on "Gliders and their value to Aeronautical Progress" by Col. Alec Ogilvie, C.B.E. and one on "Seaplanes" by Mr. C. R. Fairey, M.B.E., Chairman of the Society of British Aircraft Constructors.

Wednesday will be devoted to discussion on the papers read the previous day. The Chairman at the morning session will be the Under-Secretary of State for Air, His Grace the Duke of Sutherland, and in the afternoon the Rt. Hon. Lord Weir of Eastwood.

In connection with the Conference it is hoped to afford opportunity for a visit to the London Terminal Aerodrome at Croydon, when doubtless the unflown machines of the Air Ministry will do one of their periodical parades.—C. G. G.

NAPIER.

In the Special Foreign issue of The Aeroplane, the address of D. Napier & Son Ltd. was given as "Burlington Gardens, London, W.1." The correct address is 14, New Burlington Street, London, W.1.

A MATTER OF BUSINESS INITIATIVE.

In answer to a question addressed to the President of the Board of Trade in the House of Commons on December 11th by Sir Harry Brittain as to the number of firms which have enrolled on the Department's Special Register for the purpose of receiving information from abroad, and as to whether he could state what measures are taken to let firms in this country know of this most useful section of his department, Sir William Joynson-Hicks, Bt., Parliamentary Secretary of the Department of Overseas Trade, replied that the number of firms at present enrolled on the special register of the Department of Overseas Trade is 2,766.

The Department is in touch with a much larger number of firms than this figure represents, but it would facilitate the prompt distribution of commercial information in the right quarters if every firm desiring to receive such information would enrol on the register. Particulars in regard to the special register service of information are published from time to time in the *Board of Trade Journal* and other suitable opportunities are taken to bring it to the notice of British firms in correspondence and in interviews.

One cordially recommends all aircraft firms to keep in close touch with Sir William Joynson-Hicks' department, for apart from Sir William's personal interest in aviation one has always found the Department of Overseas Trade (at 35 Old Queen Street, S.W.1) to be about the most efficient, helpful, keen and obliging organisation concerned with Commerce in this country.—C. G. G.

WEYBRIDGE.

Passing the works of Lang Propeller Ltd. recently one was reminded of war-time days by the unmistakable roar of aero-engines on the test bench. One has been able to ascertain that Lang's are engaged temporarily in testing a number of B.R.2 engines. The works have been on overtime recently, an unusual state of affairs for a factory connected with aviation in these days, but the firm have a number of orders for air-screws from Governments and private firms and individuals in different parts of the world.—J. F. S.

NEW COMPANIES

Inventions Developments, Ltd. (186,517).—Private company. Registered December 19th. Capital £1,030 in 1,000 preference shares of £1 each and 600 ordinary shares of 1s. each To adopt agreements with A. L. Davis, S. G. Wybrow and A. Slatter for the acquisition of the patents referred to therein; and to carry on a business not particularly described. The provisional directors are: S. G. Wybrow, A.M.I.E.E., Royal Aircraft Establishment, S. Farnboro', Hants, electrical engineer, and A. Slatter, M.I.E.E., Sardinia House, Kingsway, W.C.2, electrical engineer. Registered office: Sardinia House, Kingsway, W.C.2.

MORTGAGES, CHARGES & SATISFACTIONS.

Beauforts, Ld.—Equitable charge on Beauforts Yard, Lloyds Place, Brompton Rd., S.W., dated Nov. 22nd, 1922, to secure £500 (subject to prior charges dated June 17th, 1919, and Feb. 19th, 1922). Holder: H. W. S. Chilcott, M.P., 31, St. James's St., S.W.

Arnott and Harrison, Ltd.—Particulars filed of £4,500 debentures authorised November 13th, 1922, charged on the company's undertaking and property, present and future, including uncalled capital, the whole amount being now issued.

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R.A.F. INTELLIGENCE.

Appointments.

AIR MINISTRY, Dec. 20th.

Air Vice-Marshal P. W. Game, C.B., D.S.O., from Air Ministry to H.Q., R.A.F., India (Supernumerary), pending appointment as Air Officer Commanding, 7/12.

Wing/Cmdr. G. I. Carmichael, D.S.O., A.F.C., from Palestine Wing H.Q. to R.A.F. Depot (Supernumerary), 22/11, and from R.A.F. Depot to Air Ministry (Dept. of C.A.S.) (D.O.I.), 11/12.

S/Ldrs. G G. A. Williams, from Aircraft Depot, Egypt, to command No. 1 Squadron (Iraq Command), 10/11; G. W. Williamson, O.B.E., M.C., from Aircraft Depot (India) to H.Q., Iraq Command, 5/11; T. F. Hazell, D.S.O., M.C., D.F.C., from No. 55 Squadron (Iraq Command) to command No. 45 Squadron (Iraq Command), 1/11, and from No. 45 Squadron to command No. 55 Squadron, 21/11; T. H. England, D.S.C., A.F.C., from R.A.F. Cadet College (Ground Wing) (Cranwell) to Aircraft Depot (Iraq Command), 13/12; A. R. C. Cooper, from School of Photography to Station Commandant (Iraq Command), 13/12; E. H. Johnston, O.B.E., from No. 24 Squadron to command No. 45 Squadron (Iraq Command), 13/12.

F/Lts R. J. Sanceau, from No. 1 Group H.Q. to Air Ministry (Dept. of A.M.P.), 11/12; F. P. Adams, from Air Ministry (Dept. of C.A.S.) (D.O.I.) to I.A.A.D., 15/1; A. C. Collier, from No. 24 Squadron to Air Ministry (Dept. of C.A.S.) (D.O.I.), 1/1; G S. Reed, O.B.E., to H.Q. (Iraq Command), on appointment to Short Service Commission, 1/10; R. J. O. Compston, D.S.C., D.F.C., from No. 1 School of T.T. (Boys) (Halton) to Half-pay List, 29/11; R A. Courtney, M.B.E., from H.Q., Iraq Command to Basrah Group H.Q., 9/10; W. F. Anderson, D.S.O., D.F.C., from No. 45 Squadron to No. 55 Squadron (Iraq Command) (Supernumerary), 22/11; E. R. B. Playford, from No. 31 Squadron to No. 28 Squadron (India), 31/10; R. W. Chappell, from No. 24 Squadron to No. 70 Squadron (Iraq Command), 13/12; A. Latimer, from No. 11 Wing H.Q. to Aircraft Depot (Iraq Command), 13/12; A. M. Blake, A.F.C., from No. 5 F.T.S. to No. 70 Squadron (Iraq Command), 13/12; R. F. L. Dickey, D.S.C., from School of Naval Co-operation and Aerial Navigation to No. 6 Squadron (Iraq Command), for duty as Adjutant, 13/12; F. L. Luxmoore, from No. 24 Squadron to No. 45 Squadron (Iraq Command), 13/12; I. M. Matheson, from Armament and Gunnery School to No. 70 Squadron (Iraq Command), 13/12; I. L. Wincer, from No. 2 F.T.S to Aircraft Depot (Iraq Command), 13/12.

Lieut. C. E. Driver, M.C. (The King's R.) to H.Q., Iraq Command, on appointment as G.S.O.3 (Intelligence), on attachment to R.A.F. for two years, 1/1c

Capt. J. C. E. Gillham, from Army (R.A.O.C.) to R.A.F. Depot, on attachment to R.A.F. pending appointment to Short Service Commission, 15/11.

Lieut. (Act. Capt.) T. S. James, from Army (R.A.O.C.) to R.A.F. Depot, on attachment to R.A.F. pending appointment to Short Service Commission, 15/11

MEDICAL BRANCH.—S/Ldrs. G. S. Marshall, O.B.E., D.P.H., D.T.M (Medical), from Research Laboratory and M.O.S. of I. to R.A.F. Depot (Supernumerary), whilst attached to Chemical Warfare Experimental Station, Porton, 13/11, T. S. Rippon, O.B.E., from H.Q., R.A.F., Middle East, to R.A.F. Depot (Supernumerary), 22/11; D'Arcy Power, M.C., from H.Q., Iraq Command, to No. 1 Squadron (Iraq Command), 24/10; J. Rothwell, M.B, from Aircraft Depot (Iraq Command) to R.A.F Depot (Supernumerary), 6/11, and from R.A.F. Depot to R.A.F. Hospital, Cranwell, 5/1; R. W. Ryan, M.B., from R.A.F. Hospital, Cranwell, to School of T.T. (Men), 8/1.

F/Lts. R. J. Aherne, M C., from No. 45 Squadron (Iraq) to No. 84 Squadron (Iraq), 1/9; P. A Hall, M.B., B.A., from No. 84 Squadron to No. 45 Squadron (Iraq), 1/9; T. Montgomery, M.B., D.Ph., B.A., from No. 30 Squadron (Iraq Command) to Baghdad Combined Hospital, 30/10; A. Briscoe, M.B., from H.Q., Iraq Command, to No. 55 Squadron, 23/10; J. C. T. Fiddes, M.B., from H.Q., R.A.F., Iraq, to Aircraft Depot (Iraq), 22/8; J. A. Perdrau, M.D., from School of T.T. (Men) to R.A.F. Depot, 12/1.

STORES LIST.—S/Ldr. W. B. Cushion, from H.Q.C.A. to H.Q., R.A.F., India, 13/12.

F/Lts. A. Jukes, M.B.E., from R.A F. Depot to No. 25 Squadron (Constantinople Wing), 7/12; W. A. Kingston, from H.Q., Iraq Command, to Aircraft Depot (Iraq Command), 5/11; J. C. E. Gillham, from R.A.F. Depot to Aircraft Depot (Iraq Command), on appointment to Short Service Commission in Stores Branch, 23/11.

From *The London Gazette*, Dec. 26th.

R.A.F. GENERAL DUTIES BRANCH.—The following are granted permanent commissions in the ranks stated. The notifications in the *Gazettes* of the dates indicated in brackets, appointing these officers to short service commissions, are cancelled: F/Lt. G. M. F. O'Brien, D.S.C., Oct. 24/19 (Oct. 24/19). F/Os F .G Gibbons, D.E.C., June 9/20 (June 15/20); H. G. W. Lock, D.F.C., Oct. 24/19 (Oct. 24/19). Since promoted.

F/Lt. C. P. O. Bartlett, D.S.C., is placed on the retired list on account of ill-health contracted on active service, and is granted the rank of Major, Dec. 27th, 1922. F/Lt. A. Hunter, O.B.E., is placed on the retired list on account of ill-health, and is granted the rank of Major, Dec. 27th, 1922.

From *The London Gazette*, Dec. 19th

R.A.F. GENERAL DUTIES BRANCH.—F/O. L. M. Elworthy is granted a permanent commission, Aug. 31st. STORES BRANCH.—F/O. E. J. Grout is granted a permanent commission in rank stated for accountant duties, Aug. 13th.

AIR MINISTRY, Jan. 1/23.

GENERAL DUTIES BRANCH.—Air Commodores L. E. O. Charlton, C.B., C.M.G., D.S.O., from No. 7 Group H.Q. to R.A.F. Depot (Supernumerary), 1/1; E. A. D. Masterman, C.M.G., C B.E., A.F.C., from C.F.S. to command No. 7 Group H.Q., 1/1.

Grp/Capt F. V. Holt, C.M.G., D.S.O., from R.A.F., Depot to command C F.S. 1/1.

Wing/Cmdr. L. A. Pattinson, D.S.O., M.C., D.F.C., from R.A.F Depot to H.Q., R.A.F., Cranwell, 22/12.

S/Ldrs. G. Blatherwick, from No. 1 School of T.T. (Boys) (Halton) to command No. 2 Armoured Car Company (Middle East), 13/12; D. G. Donald, D.F.C., A.F.C., from R.A.F. Base, Gosport, to Air Ministry (Dept. of C.A.S.) (D.T. & S.D.), 15/1; E. J. Hodsoll, from Air Ministry (Dept. of C.A.S.) (D.T. & S.D.) to R.A.F. Depot (Supernumerary), 22/1; C. G. Tucker, from H.Q., Iraq Command, to Aircraft Depot (India), 19/11.

F/Lts. R. E. G. Fulljames, M.C., from R.A.F. Depot to H.Q., R.A.F., India, 13/12; C. R. Richardson, from R.A.F. Depot to No. 1 School of T.T. (Boys) (Halton), 18/12; E. V. Longinotto, A.F.C., to Air Ministry (D. of P.), 10/4; C. W. Mackey, from No 8 Squadron (Iraq Command) to command C. & M. Party, Monscar (M.E.), 3/11; T. E. Salt, A.F.C., from No. 216 Squadron (M.E.) to No. 4 F.T.S. (M.E.), 11/12; E. P. Hardman, D.F.C., from No. 84 Squadron (Iraq Command) to No. 1 Armoured Car Company (Palestine Command), 5/11; C. E. V. Porter, from No. 84 Squadron (Iraq Command) to No. 1 Armoured Car Company (Palestine Command), 5/11; G. E. Wilson, from No. 4 F.T.S. (M.E.) to No. 47 Squadron (M.E.), 12/12; J. A. W. Binnie, from No. 47 Squadron (M.E.) to No. 4 F.T.S. (M.E.), 12/12

MEDICAL BRANCH.—Wing-Cmdr. H. A. Treadgold, M.D., B.A., from R.A.F. Depot to H.Q., Iraq Command, 13/12.

S/Ldrs. J. Rothwell, M.B., from R A.F. Depot to School of T T. (Men), 5/1, substituted for the notification concerning this Officer, datel 20/12. R W Ryan, M.B.—the notification, dated 20/12, is hereby cancelled. J. H. Porter, M.C., M.B., from R.A.F. Depot to H.Q., Iraq Command (Supernumerary), 13/12.

F/Lts. J. A. Perdrau, M.D., from School of T.T. (Men) to R.A.F. Depot, 9/1, substituted for the notification, dated 20/12; J. R. Crolius, M.B., from R.A.F. Depot to H.Q., R.A.F., Middle East (Supernumerary), 13/12; H. J. Higgins, from School of T.T. (Men) to H.Q., Iraq Command (Supernumerary), 13/12; C M. Jones, M.A., from Central Medical Board to Baghdad Combined Hospital, 13/12; R. G. J. McCullagh, from R.A.F. Depot to H.Q., Iraq Command (Supernumerary), 13/12; D. H W Williamson, from Electrical and Wireless School to H.Q., Iraq Command (Supernumerary), 13/12.

STORES LIST.—F/Lts. C. H. Moore, from R.A.F. Depot to No. 4 F.T.S. (M.E.), 13/12; A. J. M. Ross, M.B.E., from R.A.F. Depot to H.Q., R.A.F., Mediterranean, 13/12; F. E. J Coates, from No. 4 Stores Depot to No. 1 Stores Depot, 18/12; H. Steele, from No. 1 Stores Depot to No. 1 School of T.T. (Boys) (Halton), 29/12; H. L. Crichton, M.B.E., from H.Q., Iraq Command, to Stores Depot, Egypt, 5/11; L. A. Lavender, from Aircraft Depot (Iraq Command) to Stores Depot, Egypt, 5/11.

The New Year Honours.

ROYAL VICTORIAN ORDER.

The King has been pleased to make the following promotions in, and appointments to, the Royal Victorian Order:—

G.C.V.O.—Atholl, John George, Duke of, K.T., C.B., D.S.O., M.V.O.

THE ROYAL AIR FORCE.

C.B. (MILITARY DIVISION).—Masterman, Air Commodore Edward Alexander Dimsdale, C.M.G., C.B.E., A.F.C., R.A.F.; Bonham-Carter, Group Captain Ian Malcolm, O.B.E., R.A.F.

O.B.E. (MILITARY DIVISION).—Butler, Squadron Leader Albert James, M.C., A.F.C., Royal Air Force; Smart, Squadron Leader Harry George, D.F.C., Royal Air Force (dated Dec. 30th, 1922).

M.B.E. (MILITARY DIVISION).—Brown, Flight Lieut. Horace George, Royal Air Force; Cullen, Flight Lieut. Ian, A.F.C., Royal Air Force (dated Dec. 30th, 1922); Oakey, Flight Lieut. Wesley Howard, Royal Air Force; Wynne, Flying Officer Frederick Robert, Royal Air Force (dated Dec. 30th, 1922); Jackson, No 402315 Serjeant-Major 1st Class Percy John, Royal Air Force.

AWARDS AND PROMOTIONS.

AIR MINISTRY, Jan 1st.

The King has been pleased to approve of the following awards to the under-mentioned officers and airmen of the Royal Air Force:—

BAR TO THE AIR FORCE CROSS.—Flight Lieut. Thomas Edward Barham Howe, A.F.C.

AIR FORCE CROSS.—Flight Lieut. Edward Rodolph Clement Scholefield, D.C.M.

AIR FORCE MEDAL.—No. 314986 Sergeant William Charles Whitfield.

PROMOTIONS.

The undermentioned officers are promoted to the ranks stated, with effect from Jan. 1st:—

GENERAL DUTIES BRANCH.

GROUP CAPTAIN TO BE AIR COMMODORE.—Eugene Louis Gerrard, C.M.G., D.S.O.

WING COMMANDERS TO BE GROUP CAPTAINS.—Wilfrid Rhodes Freeman, D.S.O., M.C., Patrick Henry Lyon Playfair, M.C., Arthur Wellesley Bigsworth, C.M.G., D.S.O., A.F.C.

SQUADRON LEADERS TO BE WING COMMANDERS.—Thomas Gerard Hetherington, C.B.E., Alan Howard Jackson, Owen Tudor Boyd, O.B.E., M.C., A.F C., Justin Howard Herring, D.S.O., M.C., John Hugh Samuel Tyssen, M C.

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—Arthur John Capel, Ralph Towlerton Leather, A.F.C., Vyvyan Arthur Hemming Robeson, M.C., John Henry D'Albiac, D.S.O., Francis Percival Don, George Brindley Aufrere Baker, M.C., Harley Alec Tweedie, O.B.E., A.F.C., Roy Maxwell Drummond, D.S.O., O.B.E., M.C., Arthur Hicks Peck, D.S.O., M.C., Arthur Noel Gallehawk, A.F.C.

FLYING OFFICERS TO BE FLIGHT LIEUTENANTS.—James Humphrey Butler, Charles Ronald Steele, D.F.C., Cyril Fraser Brewerton, D.S.C., Philip Herbert Mackworth, D.F.C., John Mecredy McAlery, Malcolm Dent Nares, A.F.C., Robert Sydney Pearce Boby, Gilbert Formby Smylie, D.S.C., Louis George Paget, A.F.C., Gerald Ernest Gibbs, M.C., John Whitworth Jones, George Oswald Venn, Sylvester Lindsay Quine, M.C, Edgar Theodore Carpenter, A.F.C., Cedric Walters Hill, Paul Richard Tankerville James Michael Isidore Camille Chamberlayne, A.F.C., Charles Robert Davidson, M.C., Lance Harold Browning, M.C., D.F.C., Ralph Edgar Meek, Lee Roy Lowerison Brown, D.F.C., Edric William Broadberry, M.C., John Potter, Tom Oswald Clogstoun, Henry Dunboyne O'Neill, A.F.C., Cuthbert Joseph Stanley Dearlove, Kenneth

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Cromar Tilman, Harney Lancelot Macro, D.F.C., Walter George Preston, D.F.C., Edward Irwin Bussell, James Huddart Dand, M.B.E., Henry Basil Pett, M.C., Henry Edward Walker, M.C., D.F.C., Arthur Harold Beach, Leslie Millington Iles, A.F.C., Jack Cottle, M.B.E. D.F.C., Anthony Lauderdale Paxton, D.F.C., Albert Oliver Lewis-Roberts, D.F.C., Charles William Attwood, Gerald Mornington Bryer, A.F.C., Guy Yelverton Tyrrell, M.C., David Craik, D.F.C., Albert Frank Lang, M.B.E., William Elliott, D.F.C., Frederick Robert Wynne, Kenelm Arthur Lister-Kaye, Ivor Morgan Rodney, Claud Vernon Aristrides Bucknall, John Whitford, George Stairs Napier Johnston.

STORES BRANCH.

SQUADRON LEADER TO BE WING COMMANDER.—William Robert Bruce, O.B.E.

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—William Edgar Aylwin, O.B.E., Henry Lumsden Crichton, M.B.E.

FLYING OFFICER TO BE FLIGHT LIEUTENANT.—Henry Edwin Thomas Crocker.

STORES BRANCH ACCOUNTANTS.

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—Arthur Geoffrey Nevill Belfield, Herbert George Jones, Herbert Francis Fuller, James Leask Robertson.

FLYING OFFICERS TO BE FLIGHT LIEUTENANTS.—Ralf Harry Cleverly, Percy Jack Farmer, Harry George Bushell, Frank Owen Hall, Frederick William Arthurton, Geffrey Noel Simon, Percival Hay, M.C., Walter Rodgers Westcombe, Kenneth Robertson Money, O.B.E., John Sullivan

MEDICAL BRANCH.

WING COMMANDERS TO BE GROUP CAPTAINS.—Henry Cooper, D.S.O., B.A., Martin William Flack, C.B.E., M.B., M.A.

SQUADRON LEADER TO BE WING COMMANDER.—Harold Edward Whittingham, M.B., D.P.H., D.T.M.

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—Joseph Mary Aloysius Costello, M.C., M.D., M.Sc., John Hutchinson Wood, M.C., M.B., D.P.H., Arthur James Brown, D.S.O.

DIRECTOR OF MUSIC.

FLYING OFFICER TO BE HONORARY FLIGHT LIEUTENANT.—John Henry Amers.

Waziristan Operations.

In a telegram on December 20th from Dera Ismail Khan it was stated that air operations were carried out on December 17th against the Ahmadwam area. Eight Bristol "Fighters" and eight De Havilland machines took part in the operations and accurate bombing and the effective use of Lewis guns caused considerable damage. Ground troops then occupied the territory. The machines all returned the same night and bombing was carried on over the hostile areas for several days

A telegram from Delhi on December 26th states that Major Parsons, Political Officer in Wana, was wounded while accompanying a flight of aeroplanes engaged in punitive operations against the Zalalkhel Mahsuds.

A telegram from Peshawur dated December 30th stated that in the course of aerial bombing operations over the Mahsud country an R.A.F. bombing machine was damaged by a bomb from another machine and crashed. The pilot and observer, F/O. E. E Turner, D.F.C. and AC. Sly, were killed.

Trouble at Mosul.

A number of daily papers on January 2nd contained a rumour to the effect that a revolt has broken out at Mosul in Iraq, and that the aeroplane sheds of the R A.F. stationed there have been burned. The unit at Mosul is the famous 55 Squadron, now commanded by S/Ldr. T. Hazell, D.S.O., M.C., D.F.C.

As the rumour comes from Angora by way of Cairo, both most valuable sources of imaginative stories, it will be well to await official information on the subject.

THE R.A.F. SPORTS BULLETIN.

(Issued in Collaboration with the R.A.F. Sports Board.)

R.A.F., Mediterranean.

The continued retention of personnel in the Near East has prevented the usual participation in athletic fixtures, but the arrival of H.M.S. *Pegasus* was a welcome reinforcement to the Air Force teams.

FOOTBALL :—The *Pegasus* team, which included 7 airmen, played 3 matches during October while the ship was at Buyuk Dere against H.M.S. *Spencer*, H.M.S. *Vectis* and a team of Hussars, all of which were won. During November two further successful matches were played, the team on these occasions including 5 airmen.

In an inter-port (ship) match, the Air Force defeated the "Daymen" by 7—0, and the Seamen by 5—0.

The following are the results during October and November of the representative team, drawn from H.Q.—No. 267 Squadron and *Pegasus* :—H.M.S. *Egmont* (draw 4—4) (won 3—2). Royal Engineers (won 6—0); Sliema Wanderers (draw 1—1) (lost 0—3); Sliema Rangers (draw 3—3). H.M.S. *Ceres* (won 1—0); R.A.S.C. (won 3—2); Floriana (lost 1—3). No. 267 Squadron. Results :—H.M.S. *Pegasus* (draw 2—2) (draw 0—0). H.M.S. *Ajax* (lost 2—8); R.A.M.C. (won 3—1).

The representative team has been drawn from the following officers and men :—F/O. R. M. Grundy; Sjts. Vella and Owen; ACs. Jones, Holohan, Price, Shepherd, West, Bray, Howell, McCourt, Archer, Nicholls and Calver.

The following table shows the very satisfactory record of the representative and squadron team to date :—Played 14; Won 6; Lost 3; Drawn 5. Goals for 35; against 29.

The list of goal scorers is easily headed by AC. Price who has scored on no fewer than 17 occasions, followed by AC. Jones (6), AC. Bray (4), AC. Nicholls (3), Sjt. Vella (2), AC. Shepherd (2), AC. Howell (1).

HOCKEY :—No. 267 Squadron has played 3 matches beating the Army Educational Corps 4—0 and H.M.S. *Ajax* 2—1. A second match against the latter team ended in a draw, 4 goals all.

The team have been selected from :—F/Lts. Stewart, Elmhirst and Scriven; F/O. Pennington; Cpls. Southgate and Dunn; ACs. Hull, Hill, Yeoman, Parkinson, Jones and Patton.

BILLIARDS :—On Nov. 25th a six-a-side Tournament was played by the Sergeants' Mess of No. 267 Squadron against the Malta Dockyard and Literary Institute, resulting in a win by 600 points to 519.

POLO :—Although no matches have been played, Air Force officers have taken a leading part in Club games. The R.A.F. Polo Club now owns four ponies.

Stores Depot, Egypt.

FOOTBALL :—*Alexandria and District League.*—Red Star F.C. (lost 1—2); East Yorks (won 3—1).

Robert Hughes Charity Cup, 2nd Round.—Royal Ulster Rifles (won 3—2). *3rd Round.*—R.H.A. (lost 0—1).

R.A.F. Middle East Cup, 2nd Round.—47 Squadron (draw 0—0).

RUGBY :—Eastern Telegraph Co. (lost 6—8).

No. 5 F.T.S., Shotwick.

HOCKEY.—Hockey has rather suffered so far at the hands of Rugby and the posting of the members of the team, but two good matches have been played against Buckley and the Cheshire Regt., and though both were lost owing to lack of team work it is hoped that the team will be able to settle down and give a good account of itself in the coming months. F/Os. Inglis and Busk and P/O. Bythell have been the pillars of the defence and a genuine interest in the game is being shown by the N.C.Os. and men.

Further fixtures are required and the Sports Officer would be glad to hear from any other Air Force units, or regiments and clubs in the vicinity.

BOXING.—A contest was held on November 16th to pick the team to represent the unit at No. 7 Group eliminating contest for the Wakefield trophies. Some excellent boxing was seen, AC. Docherty shaping particularly well. The winners in each class were : Light Weight, AC. Docherty; Middle Weight, AC. Griffiths; Light Heavy Weight, AC. Wishart.

ASSOCIATION FOOTBALL.—A Team is being run in each of the two divisions of the Chester League. The first team has played six League matches, of which three were won, two lost and one drawn. The second team have played 10 matches, won 4, lost 5, and drawn 1, and they have also passed into the second round of the Chester Junior Cup, beating their opponents by 10—1.

No. 28 Squadron (India).

HOCKEY.—v. District Hqrs., won by 17 goals to 0; v. Q.V.O. Rajputs, lost by 4 goals to 5, after a very exciting and keen game; v. 53rd Siks F.F., won by 6 goals to 3.

ASSOCIATION FOOTBALL.—Two matches have been played, against No. 22 (Indian) M.T. Co., which was won easily by 5—1, and District Hqrs., who won by 6 goals to 1.

Martlesham Heath Re-union Dinner.

The third annual re-union dinner for past and present members of Martlesham Heath will be held in London on Friday, Jan. 26th, 1923. Further details will be published later.

Will any old member of the station who intends being present, kindly notify Capt. P. G. Robinson, "C" Flight, R.A.E., Farnborough, Hants.

TO R.A.F. INVALIDS.

A former Officer of the R.A.F. has placed in one's hands a sum of money which he wishes to be devoted to the relief of crashed, wounded or invalided R.A.F. officers who are in difficulties. The donor of this gift was severely injured in a crash early in the War and the sum which he is now devoting to the help of others is the product of his own gratuity plus his disability pension, which fortunately he does not need himself though very rightly he does not see why on that account he should leave it to be expended by the Treasury when he believes that it can be put to good use.

His wish is that it should be applied to the help of ex-R.A.F. officers who find themselves in need of financial relief owing to the effects of active service. For example, if an ex-officer has the chance of getting a job in civil life but before taking it up needs a small operation or a course of treatment or a brief rest cure in order to fit himself to do good work then some of this money can be used to help him. Any readers of this paper who know of thoroughly deserving cases of such a nature are invited to communicate personally with C. G. Grey at this office.

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C.M.A. Air Lines is the British title of the Compagnie des Messageries Aériennes, whose head office is at 2, Rue Galilee, Paris. The Company was originally founded early in 1919, by M. Louis Breguet, for the transport of goods from Paris to Lille, the ground communications having been so much disturbed by the European War this line, which was the first commercial aviation service in the world, was soon extended to Brussels and the line from Paris to Brussels has been maintained by the Company ever since.

In September, 1919, a service between London and Paris was inaugurated in conjunction with Handley Page Transport, Ltd. This was originally operated three times a week each way, but later, when the two Companies separated, a daily service was commenced, which has now been extended to a thrice daily service.

By an arrangement with the Compagnie Générale Transatlantique a service is run to connect with the arrival and departure of this Company's sailings between Le Havre and New York. This is the first occasion on which a large shipping company has recognised the necessity of using commercial aviation in its transport policy.

The Company's service has now reduced the time of transit between London and Paris to two and a-half hours; between London and Le Touquet to one and a-quarter hours; between Paris and Le Touquet to one hour and a-quarter hours; between Paris and Brussels to two hours and between Brussels and Amsterdam to two hours. A line has been inaugurated to run direct from London to Marseilles, calling at Paris and Lyons and connecting with the Steamship Lines to India and the East. This brings Marseilles within six and a-half hours' reach of London and Lyons within eight hours' reach of London.

The C.M.A. Passenger Service is maintained by twin tractor Farman Goliath Biplanes, fitted with two 300-h.p. Renault Engines and with a seating capacity for 12 passengers, pilot and mechanic. This machine has a wing span of 92 ft., a length of 49 ft. 6 in. and a height of 16 ft. Its cruising speed is 93 m.p.h. The freight, mail and newspaper services utilise the smaller type of single-engined Spad and Breguet.

The Compagnie des Messageries Aériennes is an association of aircraft constructors for the study and application of Aerial Transport, and among its Board of Directors appear the well-known names of Messrs. Bleriot, Breguet, Caudron, Farman, Morane, Luquet de St. Germain and Renault.—*Extract from R.Ae.C. Year Book.*

F-ADAE
F-ADAF
F-ADAG
F-ADBI
F-ACMA
F-ACMB
F-ACMC
F-ACME
F-ACMF
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AF
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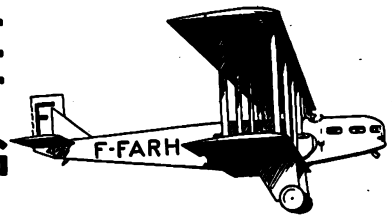

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THE REVIEW OF THE YEAR.

Owing to the primary importance of the Royal Air Force and to the amount of space required in this issue by our First Line of Defence it has been necessary to hold over till next week the first instalment of "The Review of the Year" which usually appears in the first issue of each new year.—C. G. G.

GLIDING TIME,

R.A.F. Efforts.

A report has appeared in sundry papers that Mr. Gordon England's glider has been purchased by the Glider Club established by No. 7 Group Headquarters at Andover. This statement is quite erroneous. The fact is that a month or so ago the glider was purchased by a little syndicate of three officers, S/Ldr. Conran of No. 7 Group, S/Ldr. Hunter of No. 10 Group, Lee-on-Solent, and F/Lt. Balfour of the same group.

The glider has been rebuilt and four new longerons fitted. The elevator and aileron surfaces have been increased and various other modifications made. It is hoped to try it out this week. The object of the proprietors is to get as much amusement out of it as possible and at the same time to make a careful record of results and conditions with a view to discovering what is the most conducive to successful gliding. This syndicate has "no connection with the firm next door," so to speak, No. 7 Group Glider Club, which is carrying on the good work in its own way.

Thus it will be seen that there are three distinct gliding units in the R.A.F. at the present moment, namely the official unit at the C.F.S., the semi-official co-operative club at No. 7 Group and the purely private syndicate mentioned above. It is understood that other groups of gliding experimenters are being formed in the R.A.F. at Winchester and Shotwick and it is hoped that early in the New Year there will be quite considerable results to report.

Miscellaneous.

The Courtney-Wright-Sayers glider was unfortunately totally wrecked at Itford Hill just before Christmas. The South-West gale blew down the canvas tent in which it was housed. The plane and fuselage were smashed.

The competition for the Selfridge prize of 1,000 guineas for the first glide of 50 miles in a straight line was open from Monday January 1st. No entries have yet been received by the Royal Aero Club.

Mr. F. P. Raynham and Mr. R. Vaughan Fowler are still at Torquay in connection with the film play "The Hawk." Mr. Fowler reports that the surrounding country is teeming with "Beavers."

PERSONAL NOTICES.

ENGAGEMENT.

McCLOUGHRY—LEWIS.—The engagement is announced between E. J. Kingston McCloughry, B.A (Camb.), D.S.O., D.F.C., second son of Mr. and Mrs. James Kingston McCloughry, of North Adelaide, and Freda Lewis, second daughter of Sir Alfred and Lady Lewis, of Coneybury, Lower Kingswood, Surrey.

DEATH.

TURNER and SLY.—On Dec. 28th, in the course of aerial bombing operations over Mahsud country, N.W. Frontier, F/O. E. E. Turner, D.F.C., and Aircraftsman Sly, No. 27 Sqdn., R.A.F.

MARRIAGES.

HANMER—SPENS.—At Holy Trinity Church, Brompton, F/Lt. Robert Hugh Haumer, M.C., R.A.F., eldest son of the Rev. Hugh and Mrs. Hanmer, and Miss Mary Helen Spens, youngest daughter of Mr. and Mrs. Nathaniel Spens, Palace Gate Mansions.

POWER—VAN KONYNENBURG.—On Dec. 14th, at All Saints', Cairo, Henry E. Power, Lieut. 1st East Surrey Regt., attached R.A.F., son of the late Hugh Alexander Power and of Mrs. Power, of 10, Dunsford Place, Bath, to Maria Johanna, daughter of Mr. and Mrs. Emile van Konynenburg, of The Hague.

SCRASE-DICKINS—BAILLIE.—On Dec. 18th, at the Chapel Royal, Savoy, Mr. R. Scrase-Dickins, late 60th Rifles and R.A.F., eldest son of Mr. and Mrs. Alwyne Scrase-Dickins, Herousgill, Horsham, to Mrs. Arthur Baillie, Tismans House, Rudgwick, Sussex, only daughter of Mr. and Mrs. Southby Hewitt.

WHITTAKER—FINLAY.—On Dec. 20th, at St. Mark's Church, Ballysillan, S/Ldr. John Tudor Whittaker, O.C. R.A.F. in Ireland, to Kathleen Mary Finlay, youngest daughter of the late F. W. Finlay and Mrs. F. W. Finlay, Wolfhill, Belfast.

BIRTHS.

BAYLEY.—On Dec. 26th, to Mary, the wife of F/O A. C. Bayley, R.A.F.—a son.

HERBERT.—On Dec. 29th, at 26, Brunswick Gardens, W.8, the wife or Grp/Capt. P. L. W. Herbert, R.A.F.—a son.

SYKES.—On Dec. 20th, to Major-General Sir Frederick and Lady Sykes—a son.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Dec. 24th.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 6*, passengers 51. C.M.A. Air Lines, machines 6†, passengers 11. Cie. Grands Express Aeriens, machines 2*, passengers 5. Total machines 14, passengers 67.

LONDON—COLOGNE:

Instone Air Line, Ltd., machines 10*, passengers 40.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 17, passengers, Manchester-London, 25. London-Amsterdam 18

LONDON—ROTTERDAM:

K.L.M., machines 11*, passengers 18.

SPECIAL MACHINES: 0.

Total number of trips by British machines: 33, carrying 134 pas.
Total number of trips by foreign machines: 19, carrying 34 pas.
Trips per day.—Monday, 2; Tuesday, 11; Wednesday, 2; Thursday, 17; Friday, 9; Saturday, 11; Sunday, 1.

STATISTICS.

Machines, 52; Passengers, 168; Crews, 100; Total Personnel, 268.

Corresponding week last year:—
Machines, 49; Passengers, 108; Crews, 73; Total Personnel, 181.

Corresponding week, 1920:—
Machines, 19; Passengers, 9; Crews, 18; Total Personnel, 27.

For week ending Dec. 31st.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 6*, passengers 34. C.M.A. Air Lines, machines 6†, passengers 15. Cie. Grands Express Aeriens, machines 2*, passengers 2. Total machines 14, passengers 51.

LONDON—COLOGNE:

Instone Air Line, Ltd., machines 7*, passengers 17.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 13, passengers, Manchester-London, 14, London-Amsterdam 7.

LONDON—ROTTERDAM:

K.L.M., machines 7*, passengers 6.

SPECIAL MACHINES: 0.

Total number of trips by British machines: 26, carrying 72 pas.
Total number of trips by foreign machines: 15, carrying 23 pas.
Trips per day.—Monday, 0; Tuesday, 0; Wednesday 12; Thursday, 13; Friday, 12; Saturday, 4; Sunday, 0.

STATISTICS.

Machines, 41; Passengers, 95; Crews, 81; Total Personnel, 176.

Corresponding week last year:—
Machines, 30; Passengers, 49; Crews, 48; Total Personnel, 97.

Corresponding week, 1920:—
Machines, 8; Passengers, 10; Crews, 10; Total Personnel, 20.

* These machines also carry loads of freight.

† Some machines are freighters only. C.M.A. Air Lines run an early morning machine carrying newspapers daily from Lympne to Paris.

NOTES OF THE WEEK.

STERLING K.L.M. WORK.

Croydon has been pursuing the even tenour of its way during the past fortnight and the K.L.M. has been the evenest of all as regards regularity of running. The way in which the Dutch pilots get through in any sort of weather is really wonderful. Of course the Amsterdam route has the advantage that on all except the English section the country is dead flat and with a reliable engine like the "Puma" a pilot can push along in weather which would be impossible on the Paris route.

Even the gales of Christmas time did not interfere with the regular running and, except for the 24th, 25th and 26th last, when all lines shut down on purpose, there was no interference with the K.L.M. daily service.

OLD AGE MUST COME.

The most soul-stirring event was the struggle of the old "City of London" "Vimy" to take the air with a full load of ballast on a test flight, which occurred on Dec. 22nd. Mr. George Powell started from the corner by the A.D.C. up the hill towards the Customs House and against a strong S.W. wind. The aged aircraft staggered off the ground and, still flying gallantly, sank down into a ploughed field just the other side of the lighthouse and in contemplative fashion stood on her nose—happily without damage.

INSTONES CARRY ON.

The Instone Air Line are still running to Cologne and will continue to do so. It is considered unlikely that either the British or the German Government will cause a cessation.

THE YOUNG VISITORS.

On Friday of last week the Lord Louis Mountbatten and his Lady, apparently having finished rolling Mr. Charlie Chaplin's lawn, visited the aerodrome to look over the Handley Page machines before making a flight to Paris. They were shown round by Mr. Flowers and appeared favourably impressed. While they were waiting for the W8b. from Paris to arrive that machine appeared in view simultaneously with a D.H.34, a Fokker and a "Goliath," and another D.H.34 left the aerodrome making quite a busy scene.

QUICK TRIPS.

The Daimler Airway have made some rapid trips between London and Manchester. On one occasion a return journey was made in under four hours, which is less than the single journey by ground.

A WELCOME VISIT.

An all-metal German Dornier monoplane from Berlin

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reached Croydon on Monday of this week carrying some of the directors of the Deutsche Luft Reederei who were coming to confer with officials of the Daimler Airway on the subject of the London-Berlin service. The party started before Christmas in an Albatros but this was damaged at Bremen in a gale and so a fresh start was made. The machine was very much admired at Croydon.

SURREY FLYING SERVICES BUSY.

The Surrey Flying Services are very busy in their hangar preparing for the coming season. They have purchased three D.H.9s. from Handley Page Ltd. These machines were at one time used on the H.P. Transport service and have for a period been at Cricklewood. They are being overhauled thoroughly by the Surrey Flying Services who have also reconditioned their Avro G-EAIR and have a dual control machine almost ready.

Mr. Muir and Mr. Youell have been carrying joy-riders during the Christmas Holidays and Mr. Muir took one passenger to a race meeting. It is possible that in the future the Surrey Flying Services will extend their joy-riding activities abroad.

THE A.D.C.

For the Aircraft Disposal Company Mr. Perry on Dec. 18th tested a D.H.9 and an Avro. The following day he tested the D.H.9 again. Later on he took out two more similar machines and put them through their tests.

On Dec. 29th Mr. Perry left for Dublin on a D.H.9 and Capt. Rex Stocken was also testing a similar machine. Capt. Stocken has been at Liège for some days with a D.H.9a(b).—which seems to be the best way of describing the 9a with Rolls-Royce and side radiators. While over there he visited the site chosen for a forthcoming Gliding contest in Belgium at Remouchamps (Gust-fields) near Spa. He tells one that it is quite a good hill but there is too much undergrowth, saplings, wire fences, etc.

TO BE OR NOT TO BE.

There is a rumour going around to the effect that the buildings in the S.W. corner of the aerodrome, that is to say all the hangars, offices, etc., are to be demolished. If the offices move into some of the quarters now occupied by the A.D.C. this would be a great improvement and would make the uphill take-off very much better in every way.—G. D.

Stag Lane.

During the month of December the de Havilland Aircraft Co. flew a total of 39 hours 28 mins. made up as follows:—Photography: 1 hr. 40 mins. Test Flying: 2 hrs. 45 mins. Instruction: 8 hrs. 10 mins., and General flying, 26 hrs. 50 mins.

Owing to the short hours of daylight December is always a bad month, but in spite of that 2 D.H.16s delivered a load of 2,000 lbs. of newspapers on the occasion of the opening of Parliament to Belfast and Dublin, copies of the papers being on sale in Belfast by 9 o'clock in the morning.

Similarly 2 D.H.9s flew to Manchester with newspapers arriving there by 9 o'clock in the morning. The departure of all these machines was made before it was light

A LITTLE BRIEF AUTHORITY.

Mr. S. F. Woods of the Berkshire Aviation Company was summoned on December 12th before the Wokingham county magistrate under the Air Navigation Act 1920 for flying over the town at a low altitude and for trick-flying over the town.

The prosecution stated that Mr. Woods was flying below the level of the local clock-tower and standing the machine on its nose. Quite how he did such a thing at such a height it is difficult to say but apparently the local police could not distinguish between the nose and the wing of the machine as it was proved fairly conclusively that the only flying done which departed from an even keel was an ordinary steep banked turn.

Reliable evidence showed that the machine was within reach of the aerodrome the whole time and was never below 1,600 ft.

The magistrate dismissed the charge of trick-flying and imposed what was really only a nominal fine of £1 for the low flying. Which was really very sensible, for a magistrate feels bound to support the police so the Bench did the best possible by both parties without harping too much on the officiousness of the policemen who were obviously out for the notoriety gained by such a novel act (in three parts) as litigation against an "airman."—G. D.

ALCOHOL AND AVIATION.

The following letter (apposite to the Season) has been received from Ogilvie & Partners Ltd:—

"Sir,—As a result of representations made to H.M. Board of Customs and Excise we have now obtained approval of our proposals that alcohol should be released to aviation firms for use in aero engines.

"Such alcohol will be free from the benzole hitherto insisted upon but will contain in lieu five-eighths of one per cent. of mineral naphtha in addition to the small quantity of de-naturant previously used.

"It is expected that the new regulations will come into force in about ten days.

"The use of this fuel under the bi-fuel system undoubtedly will have considerable effect on the design of aero engines.

"(Signed) W. A. BRISTOW."

[It is generally supposed that alcohol only gives a fraction of the power per unit of weight which is given by petrol and it would be interesting to know wherein lies the advantage of using alcohol, apart from the fact that it is a home product and is not controlled by any ring.—Ed.]

A LONG-DISTANCE RECORD.

On Nov. 3rd and 4th Lieuts. J. A. Macready and Oakley Kelly, U.S. Army Air Service, flew from San Diego, Cal., to Fort Benjamin Harrison, Ind., a distance of 2,060 miles. They were attempting to fly from San Diego to New York but were forced to land 800 miles short of their objective owing to a cracked water jacket. The machine used, a Fokker F IV built in Holland and delivered in March 1922 to the U.S. Air Service and renamed the Army Transport T.2., is the same one used by the same officers when they stayed in the air for 35 hours 18 mins. 30 secs. on Oct. 5th-6th.

A SIGN OF THE TIMES.

The following tale is extracted from "Aerial Age":—

Two Texas cowboys coming in from the West arrived in Pensacola. They had to wait two hours for their train there and were planning how to pass the time away. A newspaper man, attracted by their strange garb, ventured the suggestion they make a trip to the naval air station and see the seaplanes take off over the bay.

"Airships be —-—," one replied. "We don't want to see any more of those blankety-blank things. That's why we are here in this God-forsaken country now, trying to get back to Georgia. The big ranch owners have got those cussed tricks on the ranch, and one man can find more stray cattle in ten minutes in one of them than me and my pard can find riding a pinto in three days. No aeroplanes for us."

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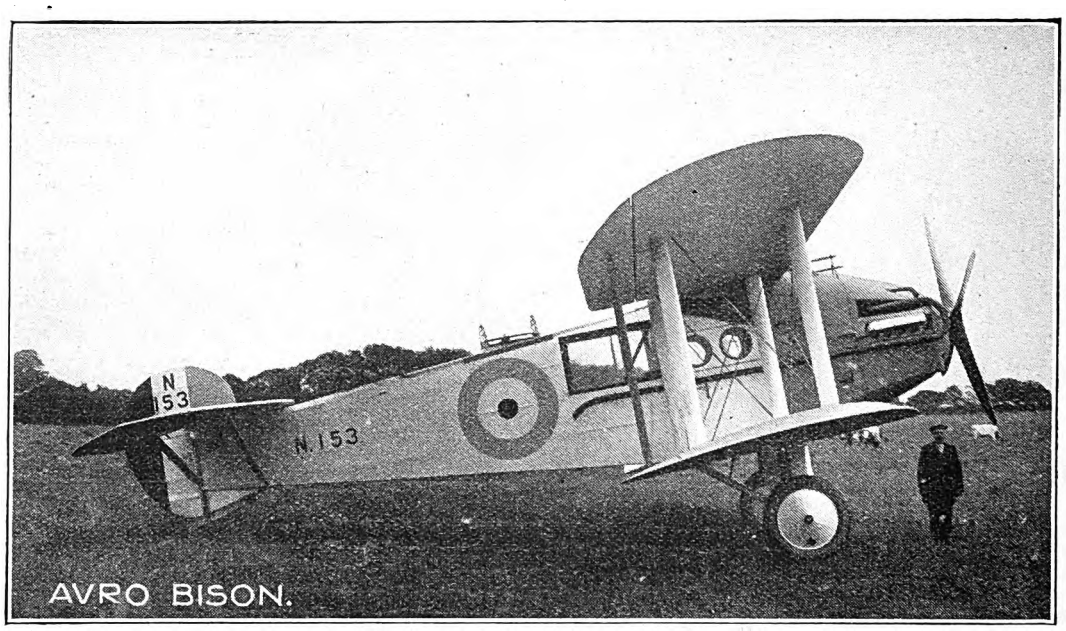

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ON 1922.—*continued.*

The British Aircraft Industry.

So far as the Aircraft Trade is concerned there is every reason to be proud of our achievements in 1922. In large and small aeroplanes, in wood and metal construction, and in engines we have more than held our own. And in the Society of British Aircraft Constructors, first under the chairmanship of Sir Henry White Smith and later under Mr. C. R. Fairey, with Mr. C. V. Allen as its able and tactful secretary, we have a trade association which for solid useful work compares favourably with its opposite numbers in Germany, France, and America.

Late in the year the Avro firm turned out the highest-powered single-engined aeroplane in the World, the "Aldershot" with the 1,000 h.p. Napier "Cub," which flew perfectly at the first time of asking. Which is of course only what one would expect of any Avro product. In fact an Avro which did not fly well would be far more surprising.

Its predecessor, the "Aldershot" with the 700 h.p. Rolls-Royce "Condor" was equally successful. The Avro "Bison," a new fleet-spotter with a 450 h.p. Napier "Lion," which has the bulk of a big passenger-carrier with the performance of a single-seater scout, is another notable achievement. And the oleo-pneumatic undercarriage of the Avro "Viper" has brought us perilously near that somewhat dangerous vehicle the aeroplane which is proof against bad pilots. Mr. A. V. Roe and Mr. Roy Chadwick have every reason to be proud of themselves.

The Fairey "N.4," which with its four Rolls-Royce "Condors" (a total of nearly 3,000 h.p.) is the World's biggest flying boat, has been completed during 1922 and though it has not yet been flown, owing to what some people regard as excessive official caution in testing, it has shown itself to be quite tame and tractable in its water tests. But a still more remarkable Fairey achievement is the production of a genuine amphibian aeroplane, the revised "Pintail" (Napier "Lion") in which the landing wheels are fixtures in the floats and need no raising or lowering.

Also the Fairey Co. has produced the World's record weight-lifting seaplane, which thanks to the Fairey variable-camber gear lifted a total load which if the same machine had been fitted with wheels instead of floats would have been equivalent to carrying 15 passengers from London to Paris at 90 miles an hour with a Rolls-Royce "Eagle VIII." It was this machine which accomplished the first half of the trans-Atlantic flight from Portugal to Brazil, when it was unfortunately crashed through no fault of its own.

Apart from these specific machines the Fairey Co. has produced some new designs in single-seater and two-seater fighters with Bristol "Jupiter" and Siddeley "Jaguar" engines, which are remarkable for simplicity of construction so that in case of a sudden demand for mass-production they can be turned out by sub-contractors with ease and accuracy. They may not be described, but it may be taken that they represent a notable step in the progress of aviation. Also the Fairey Co. has to its credit certain remarkable achievements in steel construction involving methods of manipulating steel which procure results long desired but hitherto impossible.

In the class of big machines comes the Blackburn "Dart" with its Napier "Lion" engine. It is in fact a 1921-1922 edition of the 1920 "Swift," one of the few adequate torpedo-carriers of its time. The "Dart" is so far an improvement on the "Swift" as to justify its being noted as a step in progress during 1922.

Also among big machines must be included the Boulton and Paul "Bolton," the steel-framed bomber with two Napier "Lions," which is a metal version of the highly successful "Bourges," about the first twin-engined long-range bomber to show the speed and manœuvrability of a scout. The "Bolton" is particularly remarkable for the fact that though built throughout of steel except for the fabric covering it is lighter than the wooden "Bourges." Mr. North of Boulton and Paul's has also put to the firm's credit much valuable research work in steel construction which will prove very useful ere long.

Yet another remarkable big machine is the commercial De Havilland 34 (Napier "Lion") which after being violently disliked at first is now regarded as the best single-engined passenger-carrier yet produced. The performance of the Daimler Airway's D.H.34, indexed G-EBBS which has covered over 100,000 miles without showing any need for overhaul or repair constitutes a world's record which is unapproached in any other country.

The Handley Page W.8b. with its two Rolls-Royce "Eagle VIII.'s" is another machine which has contributed materially to aeronautical progress. It is perhaps the most simple form of twin-engined aeroplane in use. The reliability of those on the London-Paris service has been proved beyond question.

Another Handley-Page machine, which has probably done even more towards helping the progress of aviation, is the "Hanley" torpedo-carrier (Napier "Lion") with the Handley Page slotted wings. Its wonderfully slow get-off and landings have showed fairly convincingly one direction in which much may be done to make flying a commercial proposition.

The Vickers "Vernons" and "Victorias" with twin Napier "Lions" have progressed far beyond the old "Vimys" from which they are descended, and actually carry the biggest regular loads for their speed of any twin-engined aeroplanes.

In small aeroplanes we have done equally well. The little Supermarine flying boat with its Napier "Lion" won the Schneider Trophy, our first peaceful international victory since 1914. Its speed was greater than that of any single-seat land machines used in the War.

The Gloucestershire Company's Mars I., more commonly known as the "Bamel," as revised for 1922 with its Napier "Lion" boosted with 1922 knowledge to something well over 500 h.p. would have won the Deutsch Cup for us also, but for a lamentable error of judgment. As it was it proved itself to be the fastest aeroplane in the World until the production of Mr. Glenn Curtiss's American projectiles.

The Armstrong-Whitworth Co.'s "Siskin" with its Siddeley "Jaguar" engine, though actually constructed earlier, made its public appearance in 1922 and proved that a small aeroplane built of steel can be lighter than a precisely similar machine of wood.

Among amphibians the Fairey has already been mentioned. Progress in amphibian design has also been made with the Vickers "Vikings" (Napier "Lions") and by Supermarine deck-fliers with similar engines. In fact so far as amphibians are concerned this country is quite a long way ahead of any other. Progress in general design is also shown in the Handasyde commercial monoplane (Rolls-Royce "Eagle VIII.") which made its first appearance late in 1922. For general neatness and compactness it is unsurpassed and its new system of undercarriage is distinctly progressive.

Metal Construction.

In the matter of metal construction, as Captain Sayers indicated last week, we are certainly not behind our competitors. We favour steel rather than aluminium alloys presumably because we know more about steel. The late Walter Staner, the great editor of the *Autocar* and the best and wisest man one has ever had the privilege of knowing, used to say that aluminium is only electrified dirt and one has never quite been able to get away from that idea. Yet it must be admitted that the one English aeroplane ever constructed entirely of aluminium alloys, the Short "Silver Streak" built in 1920, has in 1922 proved that so far it is at least as reliable as any other method of construction.

Reference has already been made to the valuable and progressive work done in steel construction by Boulton and Paul, the Fairey Co. and the Armstrong-Whitworth Co. Special mention must be given to the work of the Steel Wing Co., who are in fact the pioneers of steel aeroplane structure in this country and are still keeping well in the forefront of progress. Though the firm has not even yet been entrusted with the construction of a complete aeroplane it has made wings, tail-planes, rudders, ailerons, and eleva-

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tors of various types for standard aeroplanes and in every case the weight has been at least as low as that of similar members in wood. At the same time they have proved to be a good deal stronger and in many cases lighter.

There was at one time considerable prejudice against this steel contruction and one of the jokes against the adversaries of this work is the fact that by accident a number of control members built of steel experimentally for a certain type of aeroplane escaped into the R.A.F. general stores and were issued for use. To this day nobody knows which machines were fitted with these steel components for when covered with fabric they are indistinguishable from those of wood. It is only once in a while when a machine is crashed that it is discovered to have steel framework in a certain control surface.

At any rate we in this country have proved that steel construction is as light and strong as wood or aluminium alloys. Many good judges believe it to be more reliable in quality besides being more durable and dependable in use. And in steel construction we are far ahead of foreign nations.

It is also particularly worthy of note that we have in the Leitner-Watts airscrews the only metal airscrews in the World of proved efficiency and reliability. If there is one place more than any other in which steel would seem to be a necessity rather than a matter of choice it is in the airscrew where the speed of the tip of the blade is about equal to that of a bullet. Yet people still for some strange reason continue to use baulks of timber stuck together with glue. It is one of the quaintest extant examples of the strength of prejudice. It would be almost as rational to use a boomerang instead of a pistol.

Aero-Engine Progress.

In the matter of engines we have still further reasons for satisfaction. The Napier "Cup" of 1,000 h.p. is the biggest aero-engine in the World to have flown successfully. The Napier "Lion" of 450 h.p. has proved itself in bitter commercial competition to be unsurpassed for reliability. And moreover there is no other engine of even approximately the same weight for power which has been in regular use to the same extent.

The good old Rolls-Royce "Eagle VIII" although it is officially regarded as obsolete has continued to do excellent work in Service and commercial flying alike. The "Eagle IX" is as yet unproved in public, but when the Rolls-Royce firm issue a new type as an improvement it is fairly safe to bet that it *is* an improvement. The Rolls-Royce "Condor" of approximately 700 h.p. has not been much used as yet, but it is going through the usual Royce process of starting with a low claim for power and steadily working up and up till it exceeds by far the original estimate.

The Siddeley Company, having developed the "Puma" from the old "B.H.P." engine have made it at least as reliable as any engine in the world, so that it is to-day a universal favourite among pilots. That being done they began to develop air-cooled radials and to-day the "Jaguar" and its little brother the "Lynx" are among the World's best engines. In fact one of our most experienced pilots has said that the "Jaguar" is the smoothest-running engine he has ever driven.

The Bristol Company having taken over the deceased "Cosmos" firm's patents have with the able assistance of Mr. Roy Fedden made the "Jupiter" and the "Lucifer" very notable successes. The "Jupiter" gives its full 400 h.p. and at that has passed the Air Ministry's most searching tests as well as the tests of the French Section Technique. The "Lucifer" has also passed its tests and has shown itself in the air to be the best three-cylinder engine ever made.

Looking still further ahead one learns that the tests of the Beardmore semi-Diesel heavy-oil engine, which is one believes to be a six-cylinder job giving 700 h.p., are progressing quite satisfactorily. The experiments which are being made with a single-cylinder unit are said to point to success at an early date. Should the engine do what is expected of it we shall not be far from the happy day when petrol with its attendant risks and expense will be abolished.

A Very Good Year.

When one looks back on such a record of achievement by a poor little unconsidered industry in a year when everybody has been on the verge of bankruptcy one feels more than ever proud of our undefeatable English obstinacy. Let it be remembered that all this progress, which goes very far towards retaining that supremacy in the air which we held at the end of the War, has been made at a total cost which is a mere fraction of what the Navy pays for a new battleship.

Our whole Air Force Vote is barely equal to the cost of a capital ship and the vote for new aeroplanes and engines and experimental work is only a small portion of the total Vote. How the English Aircraft Industry has done what it has done with so little money is one of the marvels of the age. The eminently satisfactory progress which we have made merely exemplifies one's pet theory that the more difficulties that are put in an Englishman's way the better the progress he makes.

One hears people in the Trade lamenting the scarcity of orders and of money. Yet one cannot help believing that if they had had more orders and more money they would have grown fat and lazy so that we should have accomplished far less than we have done. To-day everybody concerned with aviation, from the managing directors of the big firms down to the mechanics who tune up the machines or engines, is working for less money than he could get in other and more flourishing trades. We all take less than we are worth simply for the privilege of remaining in aviation, hoping some day to reap our financial reward but hoping still more that we may live to see the day when the Air Force is the King's greatest service and when flying is the universal method of transport. It is because we have no chance of fatty degeneration that the work of everybody concerned with aviation is as good as it is. And judged by any standard the work of the Aircraft Industry in 1922 has been very good indeed.—C. G. G.

NAVIGATION ON THE PARIS ROUTE.

The rumour has been revived presumably by interested parties that the British Government "is understood to be ready" to construct on the Loth Radio system a cable line for the guidance of aircraft from Croydon to the coast and that the French Government will carry on the cable to Paris. This rumour is officially denied, and unofficially the view has been expressed that the use of such a cable would probably lead to collisions when several machines are flying along the line in the dark or fog.

It is also stated unofficially that the Air Ministry has more belief in the proper development of directional wireless. With this view one agrees provided of course that proper directional wireless is accompanied by proper observation posts in France under our own control so that British aeroplanes do not have to depend on the extraordinarily defective French system of wireless and of weather observation.

The New Ray.

Incidentally much more will depend on proper apparatus for landing in fog than on actual direction of the machines. It would be interesting to know whether the Air Ministry is in full possession of all the particulars about the fog-piercing rays the secret of which has been acquired by the Admiralty. It is said that provided ships are fitted with the proper apparatus it is possible for them to see one another at a very considerable distance in the thickest fog and it is obvious that such apparatus would be of the very greatest use in landing aeroplanes in fog.

One is told that this ray is visible only with the use of special receiving apparatus and not audible by any apparatus. It is somewhat natural that the secret should be guarded rather carefully.

ROUND THE WORLD.

Mr. Alan J. Cobham will start from London on or about March 24th in an attempt to fly round the World.. He will use a D.H.9 supplied by the De Havilland Aircraft Company and three "Puma" engines have been supplied by Siddeley Motors Ltd. Floats which are being built by Short Bros. will be fitted at Shanghai and the remainder of the journey will be attempted with the machine fitted as a seaplane.

The route will be across Central Europe via Vienna, Constantinople, Aleppo, Baghdad, Karachi, Shanghai, Japan, Aleutian Islands, Vancouver, Camp Borden, St. John's, Newfoundland, the Azores, Lisbon, London.

He will take with him a navigator and a mechanic. Lt.-Com. Mackenzie Grieve's name has been mentioned.

Other attempts are to be made this year by Sir Keith Smith on a Vickers "Viking" with Napier engine and Messrs. MacIntosh, Tymms, and McLoughry on a Fairey seaplane with a Rolls-Royce "Condor" engine.

TENDERS INVITED.

The Col. Fernando Rich, Military Attaché to the Spanish Embassy, intimates that tenders will be received in Madrid up to the 8th of February next for the acquisition by the Spanish Service of Military Aviation of thirty fighting, thirty reconnaissance and ten bombing machines.

The conditions of the tender have been published in the following numbers of the "Gaceta de Madrid," viz., 316, 319, 325, 358, under dates 12th, 15th, 21st of November last and 24th of December last.

THE FRENCH COMBINE.

The amalgamation between the Cie des Grands Express Aeriens and Cie Messageries Aeriennes duly took place on Jan. 1st. It seems probable that the whole will be called by the latter of the two names.

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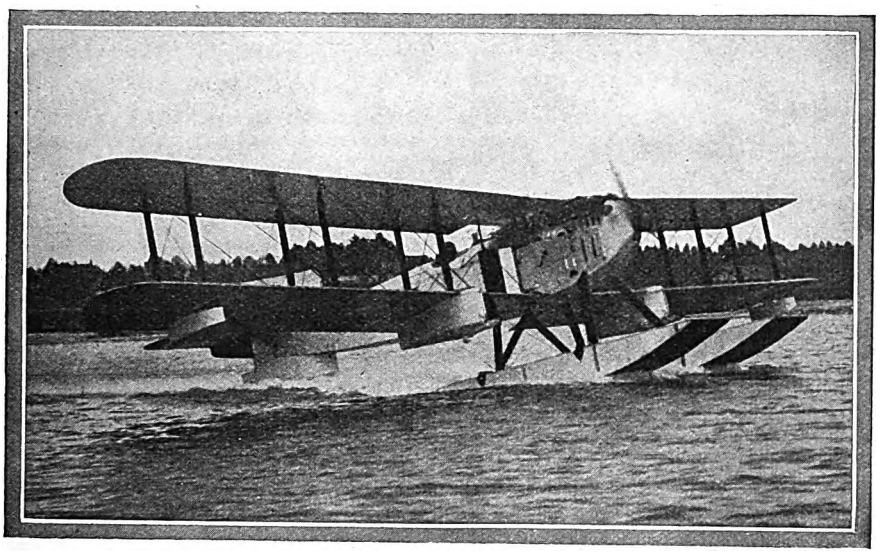
ACROSS THE SOUTH ATLANTIC



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THE REVIEW OF THE YEAR (*Compiled by M. H. & G. D.*)

JANUARY, 1922.

Service Aeronautics.—The promotion of Air Commodore Philip Game, C.B., D.S.O., to be Air Vice-Marshal was notified as from Jan. 1st.

On Jan. 1st Air Commodore B. C. H. Drew, C.M.G., C.B.E., was transferred from H.Q., M.E.A., to command Egyptian Group H.Q.

On Jan. 3rd it was notified that Air Commodore F. C. Halahan, C.M.G., D.S.O., M.W.O., assumed duty as Director of Aeronautical Inspection vice Brig.-General Bagnall-Wilde, appointed Director of Research.

On Jan. 5th there appeared in the *Pall Mall Gazette* an article written by an R.A.F. officer who appeared to have a grievance against his Service making certain lying charges against the efficiency, the organisation and the progress of the R.A.F. which, had the *Pall Mall Gazette* had any considerable influence among people who matter, might have done serious injury to the reputation of the R.A.F. This attack was the first shot fired openly against the R.A.F. by the supporters of the Navy.

On Jan. 10th the Secretary of the Admiralty issued a report of the investigation made by the Board of Admiralty into the history of the design of the R.38 and her construction up to Oct., 1919, when the responsibility for the design and construction was transferred to the Air Ministry. The report stated that no undue risk was taken and that experience and comparison with German airships made permissible any change from previous practice as regards safety which had been made.

It was announced on Jan. 11th that the Air Ministry was seeking the consent of the Treasury for the allocation of a sum of £50,000 as a prize for a helicopter to fulfil certain specified conditions. Later in the year it was confirmed that the offer of such a prize was still under consideration, though nothing definite was announced about the conditions.

On Jan. 16th Capt. A. J. L. Scott, C.B., M.C., A.F.C., Secretary to the Secretary of State for Air, died in a nursing home of double pneumonia after a few days' illness.

Civil Aviation.—Early in January tests were made by the de Havilland Company at Stag Lane with an "Ad Astra" Silencer fitted to a Siddeley "Puma" on a D.H.9c. This was a considerable advance on previous silencers.

The Instone Air Line celebrated the New Year by clothing their pilots and officers in uniform which somewhat resembled those worn by the Mercantile Marine.

On Jan. 11th it was notified in The Aeroplane that for the first time a real amphibian aeroplane had been produced. The machine was a Fairey of the "Pintail" type, Napier engine, in which the wheels are a fixture in the floats and do not need to be raised or lowered.

It was also noted that Lieut.-Col. Vincent Nicholl, D.S.O., of the Fairey Company had on a machine specially designed for weight-lifting got off the water with a Rolls-Royce "Eagle VIII" engine carrying a total load of 7,200 lbs., of which 3,100 was useful load. This equals approximately 20 lbs. per h.p., which had never been approached by any seaplane of modern speed. The performance is equivalent to carrying 15 passengers from London to Paris at about 90 miles an hour with an ordinary 360 h.p. "Eagle VIII" engine. Subsequently it turned out that this machine was built for the famous South Atlantic flight.

Mr. A. S. Butler, who has come prominently before the eyes of the public as an amateur pilot of considerable skill, was appointed a Director of the de Havilland Aircraft Company. It was stated that he had ordered from that firm a three-seater runabout with a Rolls-Royce "Falcon" engine. This was the first announcement of the building of the D.H.37.

The Aircraft Disposal Company were carrying out tests with a Bristol "Fighter" which they were preparing for Her Majesty the Queen of the Belgians. The same firm were also exhibiting some three-seater D.H.9's which were to be used for joy-riding and air line work in Switzerland.

The D.H.29, commercial cantilever monoplane with Napier "Lion" engine, was taken to Martlesham for type tests.

On Jan. 25th a complete list of existing World's Records for flying was published.

Aeronautics Overseas.—M. Peugeôt put up a prize of 20,000 francs for the first man-driven aeroplane to cover 50 metres in each of two opposite directions over a flat surface, the competition to be open to all nationalities except Germans, Austrians, Turks and Bulgars.

At the beginning of January the route from Paris to Constantinople to be opened by the Compagnie Franco-Rumanie was first covered in both directions by MM. Deulin and de Marmier on a Lorraine-engined "Spad."

It became known on Jan. 1st that on Dec. 30th, 1921, Edward Stinson and Lloyd Bertaud on a "J.L.6" all-metal monoplane (Junkers type) had broken the World's Duration Record, their unofficial timing being 26 hrs. 19 mins. 50 secs.

In The Aeroplane of Jan. 4th it was noted that M. G. Roche d'Estrez, the editor of the French paper *L'Air*, had taken over the publication of *La Technique Aéronautique*.

A message from Washington on Jan. 9th notified that the representatives of the Five Powers had come to the conclusion that it was impossible then to limit the development or use of aircraft and had that day adopted a resolution recommending the creation of an international commission to study the question with a view to future limitation. The Committee agreed to the report of the Sub-Committee, which found that to limit aircraft would retard commercial development.

In The Aeroplane of Jan. 25th it was noted that M. Laurent Eynac remained Under Secretary for Military Aviation in France and that M. Flandin had been elected President of the French Aero Club.

The Farman Air Line, the Cie. Generale des Transports Aériens, amalgamated with the Messageries Aériennes during the month.

FEBRUARY, 1922.

Service Aeronautics.—On Feb. 4th the R.A.F. Rugby Team was beaten by the Royal Navy by three tries (9 pts.) to a try and a penalty goal (6 pts.) at Queen's Club.

On Feb. 6th, 7th and 8th the Second Air Conference was held at the Guildhall. A certain amount of publicity for aviation in general and for some individuals in particular was obtained in the general press.

Group Capt. E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C., A.D.C., was appointed to be Air Secretary to the Secretary of State for Air.

Also on Feb. 14th the Secretary for India stated that the Government of India regretted that the financial position precluded them from making any contribution to the establishment of the experimental Imperial Airship service which had been proposed.

In The Aeroplane of Feb. 15th those portions of the Report of the Geddes Committee which affected aviation were briefly given. As compared with the Estimates for the previous year the Committee recommended a reduction of £5,500,000 on the R.A.F. vote. The report displayed a lamentable lack of appreciation of the importance of Air Power.

In the House of Commons on Feb. 15th Mr. Baldwin Raper disclosed the dangerous state of the equipment of the R.A.F., and demonstrated that, with a few exceptions, the R.A.F. was mounted on machines built during the war of war-emergency material. It was noted that the blame for this did not attach to the R.A.F. Authorities but to the Government.

Final tests in the Air Ministry Crash-Proof Petrol Tank Competition were held at the Royal Aircraft Establishment, Farnborough, on Feb. 20th and 22nd, the three final competitors being those made by Commander Boothby, R.N., the Imber Self-Sealing Tank and the India-Rubber and Gutta Percha Co.

In The Aeroplane of Feb. 22nd it was noted that as soon as the necessary arrangements could be made it had been decided to withdraw all R.A.F. Units from Ireland, and to dispose of the existing Air Stations.

During the month of February the R.A.F. Memorial Fund Executive Committee announced that the grants made to the Fund during the year 1921 amounted roughly to £4,500.

On Feb. 23rd Air Vice-Marshal Sir E. L. Ellington, K.C.B., C.M.G., C.B.E., was appointed to command Middle East Area on termination of his appointment as Director-General of Supply and Research, and Air Vice-Marshal Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O., was transferred from M.E.A. to the Air Ministry on appointment as Director-General of Supply and Research, which appointments were gazetted on Mar. 10th.

On Feb. 24th the R.A.F. Club was opened by Group Capt. H.R.H. the Duke of York K.G., G.C.V.O.

On Feb. 27th Group Capt. P. L. W. Herbert, C.M.G., C.B.E., was appointed Deputy Director of Training, Air Ministry, and Air Commodore H. C. T. Dowding was transferred from No. 1 Group H.Q. (I.A.) to H.Q. (I.A.) as Chief Staff Officer.

On Feb. 1st the precise composition of the International Air Traffic Association was published.

Civil Aviation.—The first R.Ae.C. certificate to be taken at the London Terminal Aerodrome was that of Mr. M. Vintcent, a Cranwell cadet, who qualified on a Royal Aero Club 'Avro."

The Bristol 10-seater was definitely taken over from the Air Ministry by the Handley Page Transport Company.

The Handley Page 0/400 with "Jupiter" engines was being tested thoroughly in the air by Handley Page pilots.

(*Continued on page 34.*)

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

A description of the very cheap and simple method of making wind tunnel tests without a wind tunnel which has been devised by Mr. O. T. Grosspelius is described below in an abstract of a paper read before the Institute of Aeronautical Engineers.

The Dornier "Komet" all-metal monoplane which has recently visited Croydon is described and illustrated in this issue. This machine is of very simple construction and appears to be quite satisfactory in practice.

TESTING MODELS WITHOUT A WIND TUNNEL.

The design of aeroplanes at the present moment depends very largely upon the results of tests made in the wind tunnel. The wind tunnel with its measuring appliances is a very expensive and delicate piece of apparatus, and in consequence it is beyond the means of many of those who would like to use it.

The development of a really cheap and simple apparatus which will give reasonably accurate measurements of the forces on models of wings, or of complete aeroplanes should be of extreme value, for it will make it possible to experiment much more cheaply and therefore on a much larger scale than at present. Also it will break the practical monopoly of this class of work which is at present held by a small coterie of scientists, whose work—valuable as it has been and is—does not and cannot cover more than a fraction of the field available for exploration.

The paper read by Mr. O. T. Gnosspelius before the Institution of Aeronautical Engineers on December 15th described the method which the author has developed for making model tests. This apparatus is based on a method described by Mr. Ellis Williams, B.Sc., in 1911, which consists of swinging the model on a pendulum.

The General Principles Involved.

The method of measurement of the forces on the model is, in principle, simple. The model is attached to the end of the swinging arm with its span vertical, so that the lift forces act at right angles to the plane in which it is swung. Lift therefore deflects the pendulum sideways and may be measured by measuring this deflection.

A frictionless pendulum dropped from the horizontal would rise again to the horizontal Any friction or resistance to the swing will reduce the height of each swing—and by measuring the extent to which the pendulum falls short on each swing it is possible to measure the total resistance. Obviously it is possible by the same method to measure the change of resistance due to any change in the pendulum, that is to say one can measure the resistance of pendulum alone and of the pendulum with model, and so arrive at the resistance of the model alone.

The apparatus as developed by Mr. Gnosspelius consists of a pendulum with its centre of gravity as close up to its pivot as possible The shorter the distance from pivot to C.G of the pendulum the shorter the time taken for each swing and therefore the higher the speed of the pendulum end for a given total length. The upper third of the pendulum is of steel tube with a lead weight of about 35 lbs. cast round it. The lower two-thirds is of duralumin tube. The whole is carried from a bearing at the upper end.

The model to be tested is carried in a tubular frame. This frame is so made that lead weights, equal to the weight of the model may be inserted within the tubes so that the C.G. may be the same when the model is not there. This is essential, as any alteration either in weight or C.G. of the whole apparatus would alter the natural period of the pendulum and would considerably complicate the task of computing the resistance with and without model in place.

The Method of Measurement.

Drag forces are measured by measuring the height of the pendulum, dropped from the horizontal at the end of the first swing. It was first attempted to fit the pendulum with a marking mechanism, but the drag forces are so small that the variable friction forces on the marking gear were so large as to spoil the accuracy of measurement.

A trial and error method is now employed—a pin is stuck into a scale and is either knocked out or missed altogether by the pendulum. A sufficiently accurate measurement was found possible by this method. It is obvious that the resistance measured in this way is the average resistance over the whole swing; during which the velocity varies from zero to a maximum and back to zero again. The assumption is made that resistance varies as the square of the speeds.

Lift forces are measured directly by loading the pendulum with known lateral forces and measuring the deflection. When testing a model for lift the maximum deflection sideways is observed. This corresponds to the lift at maximum speed, and lift forces are not therefore computed on the assumption that they vary as the square of the speed The speed corresponding to the deflection is calculated.

Pressure Plotting.

Pressure-plotting can also be carried out by the pendulum—the necessary passages in the model being coupled to a small tube carried up the pendulum and connected by a flexible tube to an inclined alcohol U tube.

It is obvious that this type of apparatus is cheap to construct and costs little to operate. The air through which the model moves is still, and questions of turbulence—other than such as may be caused by the model—do not arise. Experience indicates that the accuracy of the method is high; repeat experiments on the same model agree to within about 1%.

On the other hand the motion of the model is not steady but is accelerated and the motion is not rectilinear. These two facts may cause the results obtained to be in error, but when tests are made on normal type wings which have been tested at the N.P.L., the results obtained agree very fairly with N.P.L. figures. On some very thick sections however the results do not agree with N.P.L. and other wind channel results.

Observations of Vortices.

Using the pendulum method it is possible to observe to some extent the effect produced on the air by the passage of the model. To do this it is necessary to produce a smoke-cloud and to swing the model through it.

Wing tip vortices can clearly be seen. There is no vortex at the angle of zero lift and the vortices increase in size and probably in velocity up to the burble point when the motion changes. With square ended wings the centre of the vortex is on the line of the wing tips, but below the wing. With tapered wings the centre of the vortex comes in towards the centre of the model and the size of the vortex increases, the speed of rotation apparently decreasing. With a biplane two sets of vortices are formed, which rotate separately and finally round one another. In this case the diameter of the vortices appears to be smaller. The vortices persist long after the passage of the model and have been observed at a distance of 800 to 900 chord lengths. When the model passes a distinct kick is given to the air at considerable distances from the model—especially on the upper side of the wing.

As to the results of tests made with the apparatus Mr. Grosspelins states that while experiments sometimes give apparently illogical results they continue to indicate the possibility of increasing the aerodynamic efficiency of the forms used for aircraft. Gliding angles for the complete model of 1 in 18 are certainly possible—probably better values still can be obtained.

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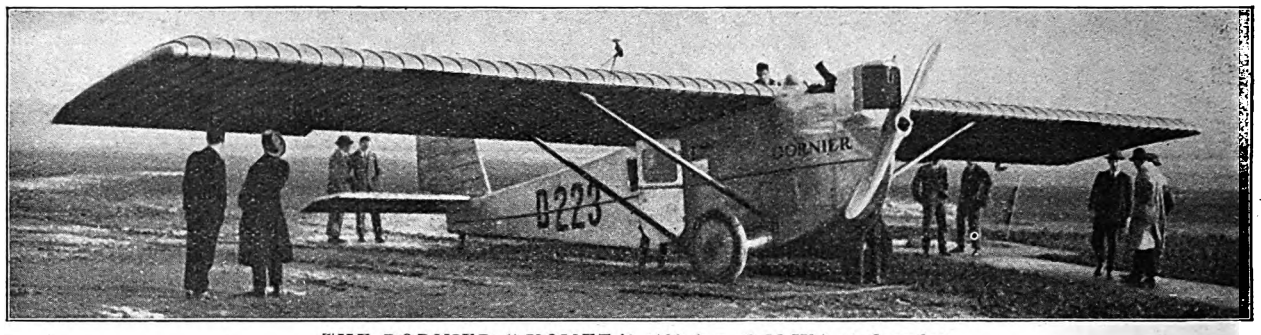
THE DORNIER "KOMET."



THE DORNIER "KOMET" (180 h.p. B.M.W.) at Croydon.

The Dornier machine which has just paid a brief visit to Croydon is one understands the original machine of this type, which was described and illustrated in The Aeroplane during the latter part of 1921. The machine is therefore of some age, and it is of some interest to observe the excellent condition in which the whole of the metal work remains to this day.

The machine is a monoplane with a thick wing placed on top of a deep box-section fuselage. The wings are braced from the bottom of the fuselage by steel tube stays running out to about one-third of the half span on each spar. Within the fuselage and below the wing is a comfortable cabin seating four, two facing forward and two aft. The pilot's cockpit is above and forward of the cabin.

The engine is mounted high in the fuselage, and the undercarriage consists of two axles, which project horizontally from the lower corners of the fuselage and are supported by and sprung from a pair of wing section projections built on to the side of the fuselage.

The metal construction of the machine is of considerable interest. It is generally very simple, and should be quite cheap—and it appears to give satisfactory results. The main wing spars, and also those of the tail surfaces, are built of high tensile steel. All the rest of the machine is duralumin.

The wing and tail spars are constructed of D section top and bottom members tied together by a Warren bracing of trough section. On the wings there are used a relatively small number of box section ribs of duralumin of great stiffness, with apparently intermediate former ribs of flat sheet. The covering consists of flat sheets with turned up flanges which fit between the former ribs and are rivetted through the projecting edges of these ribs after being covered with a trough section capping strip. This method of covering is in fact identical with that used on the Short "Silver Streak." The tail surface covering is applied in the same way.

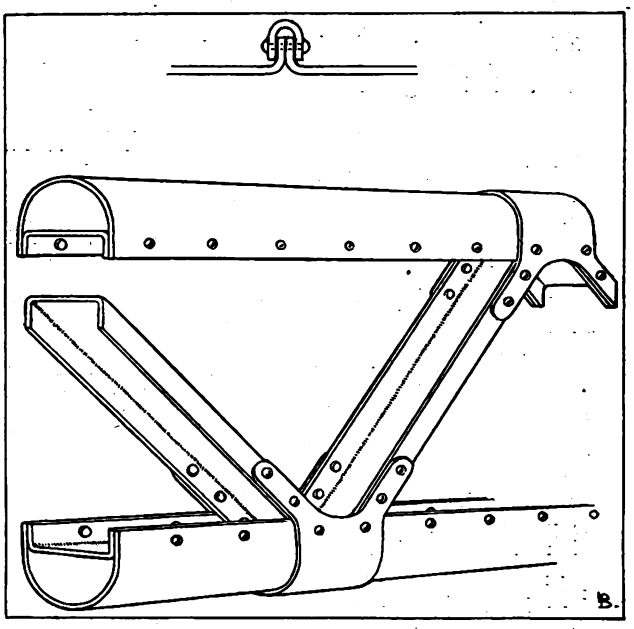
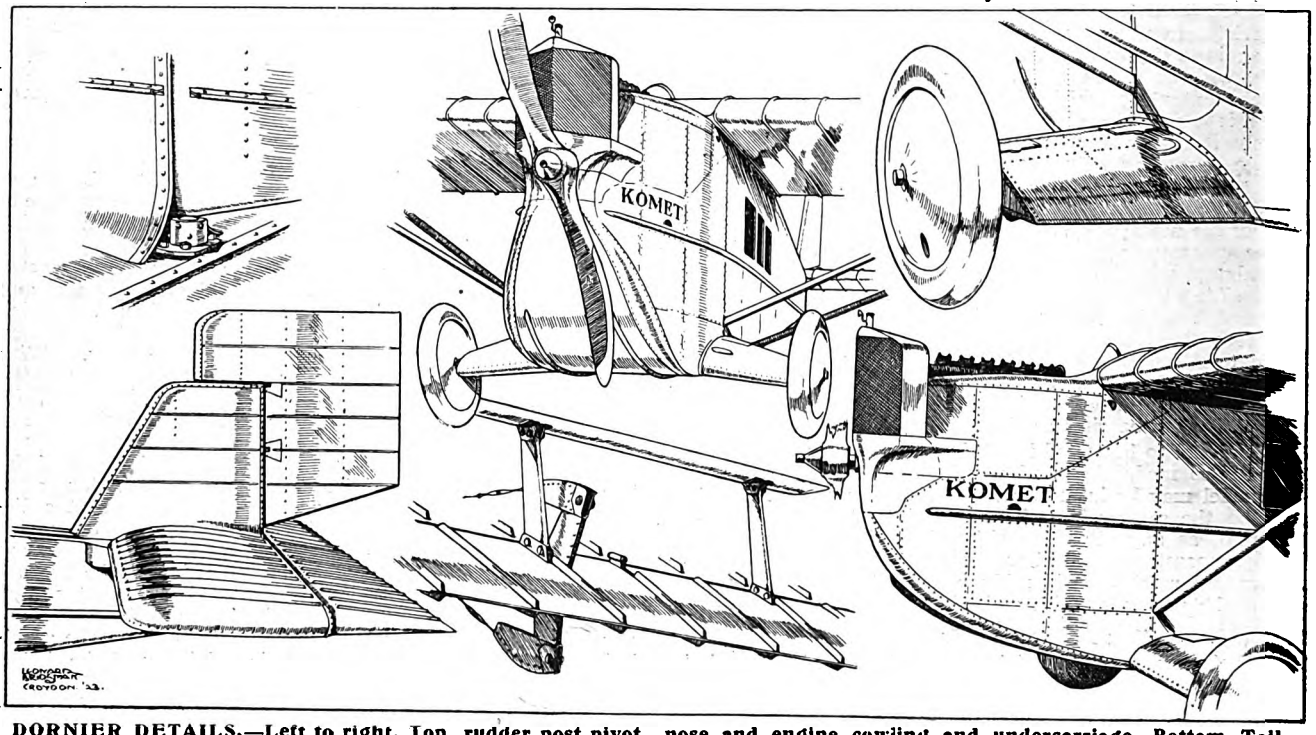


Diagram of the Dornier spar construction. Above a section of the covering joint.

The fuselage is built entirely of duralumin, and consists of formers covered with quite fairly thick sheet—somewhere about 18 gauge apparently. Such of the formers as could be seen were of a D section very similar to that used for the



DORNIER DETAILS.—Left to right, Top, rudder post pivot, nose and engine cowling and undercarriage. Bottom, Tail, aileron king posts and balance, and side view of nose.

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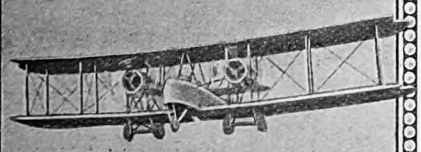

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steel spar flanges, and a similar section is used for certain longitudinal stiffeners applied to the outside of the fuselage covering, and for the supports of the engine bearers.

All the hinged control surfaces are built on very stout steel tube front spars, carried in substantial bearings which embrace the tubes. In the case of the ailerons this tube is about 3 in. diameter. In all cases the hinge tube is recessed into the fixed surface ahead of it so that there is practically no gap at the hinges.

The ailerons are balanced by a balancing plane carried above and ahead of the hinges in the manner devised in this country by the Avro firm during the war, and at almost the same time by Herr Dornier in Germany. The ailerons are controlled by cables running to somewhat clumsy looking kingposts fitted with quadrant sheaves—in contrast with the elevators and rudders which are provided with control connections completely enclosed by the fuselage.

Originally this machine was fitted with the original B.M.W. IIIA engine of 185 h.p. nominal, but capable of developing some 230 h.p. As this engine was of the supercompressed type it presumably gave the machine a ceiling higher than that admissible under the regulations imposed on German aircraft. Consequently the machine is now fitted with a peace-time type B.M.W. of a maximum output of 180 h.p. which has considerably reduced the machine's performance. It is however understood that the machine cruises at about 80 m.p.h. with full load.

The main dimensions of the "Komet" are given in the following specification :—

SPECIFICATION OF THE DORNIER "KOMET."

Span	17 m.	Weight loaded	1,830 kg.
Length	9.1 m.	Engine	180 h.p. B.M.W.
Chord	3 m.	Wing loading	38.8 kg. per sq. m.
Height	2.5 m.		
Wing area	47 sq. m.	Power loading	10 kg. per h.p.
Weight empty	1,100 kg.		

DR. JUNKERS ON THE METAL AEROPLANE.

Owing to illness Dr. Junkers himself was not able to deliver his own paper on the metal aeroplane before the Royal Aeronautical Society on the afternoon of January 4th. He however sent as his representative Dipl. Ing. Hermann Mierzinsky. Owing to delay occasioned by Prof. Junkers' illness the paper itself was not in print at the time of the meeting, and as there was a large number of lantern slides Mr. W. J. Stern, of the Air Ministry Laboratory, South Kensington, who had undertaken the reading in English, was obliged to confine himself to the description of the slides.

Under the circumstances it is obviously impossible to report the paper properly, and it is therefore proposed to hold over any attempt to deal with it as a whole until the paper proper is available.

The slides exhibited and the commentaries thereon read by Mr. Stern were of a very interesting nature and by themselves provided ample material for a separate lecture, but not having been designed as a self-contained unit there was rather a lack of continuity which made it impossible for members of the society to contribute any very satisfactory discussion.

WIRELESS DIRECTION-FINDING.

["Direction and Position Finding by Wireless." Published by Wireless Press, Ltd. 9s. net. 376 pp. 250 ill.]

This is the first book of its kind that has yet been published. For some months past the number of books on wireless telephony has been swelling rapidly in response to the increasing public interest in wireless broadcasting. Many of these books are of a very ephemeral nature and of the others there is not one which attempts to deal exclusively with the subject of wireless direction and position finding, with the exception of this new arrival. The subject is one of special importance to aviation and indeed there is little in this volume which has not some bearing on problems of aircraft wireless.

The subject-matter is handled sensibly. Following a brief summary of the methods employed by early experimenters, the second chapter comprises over 50 pages on "The Theory of the Wireless Direction Finder." Using as simple phraseology as the subject allows the author describes the nature of transmitted waves and from that goes on to show how directional effects can be obtained from these waves on certain types of receiving aerial. Another chapter deals with the various kinds of detecting and receiving instruments which have been proved to be of most service in work of this kind, and a fourth contains a good deal of very valuable information on the subject of maps.

One of the most important chapters in the whole book is that which deals with night effect and freak phenomena. Ever since the earliest attempts to make use of the directional effects of certain forms of wireless aerials it has been noticed that serious inaccuracy can be occasioned by certain more or less hidden causes. It was observed for instance that a bearing of a fixed station at night varied considerably from its bearing during the day. Very often this difference would come into being within a few minutes after sunset. Or again it was found that the phenomena of "refraction" is repeatedly manifested in the case of wireless waves which pass over sea and land. A consistent error of about 4 or 5 degrees occurs when electro-magnetic waves strike the coastline at acute angles. As in the case of light waves this error varies considerably between waves whose length does not exceed a certain amount. These important factors are discussed with considerable care and detail.

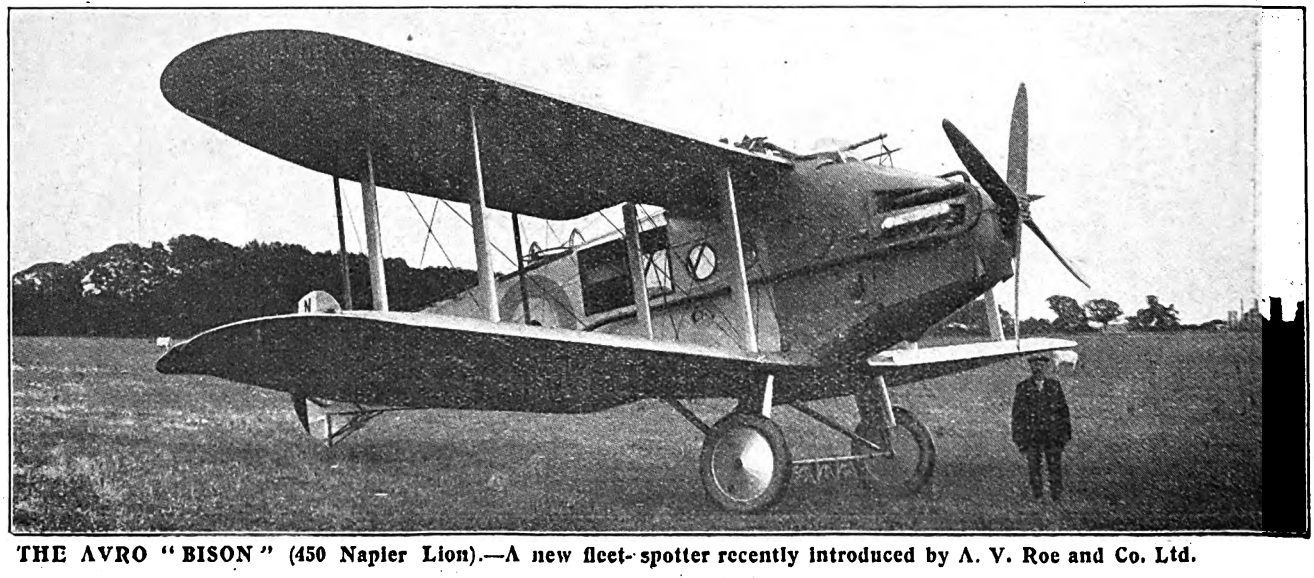
The book also contains an amount of useful information for all who are engaged in *practical* work of this kind, and possesses a valuable bibliography. No collection of wireless textbooks will be complete without it.

LEITNER-WATTS AIRSCREWS AT PARIS.

A very striking feature of the Paris Aero Show this year was the very large number of Leitner-Watts steel airscrews which were to be seen there.

La Société des Helices Lumière, who have purchased the French rights for this design, exhibited a number of these screws of French manufacture on their stand. In addition examples of this type—some of British manufacture—were visible on a number of stands.

On the Farman stand was shown one of the two Leitner-Watts airscrews which recently helped to set up the world's duration record on the Farman "Goliath." The other screw concerned could not be shown as only one spare of the particular type was available, and the machine itself is in regular service on the Paris-Brussels route. The Buscaylet-de



THE AVRO "BISON" (450 Napier Lion).—A new fleet-spotter recently introduced by A. V. Roe and Co. Ltd.

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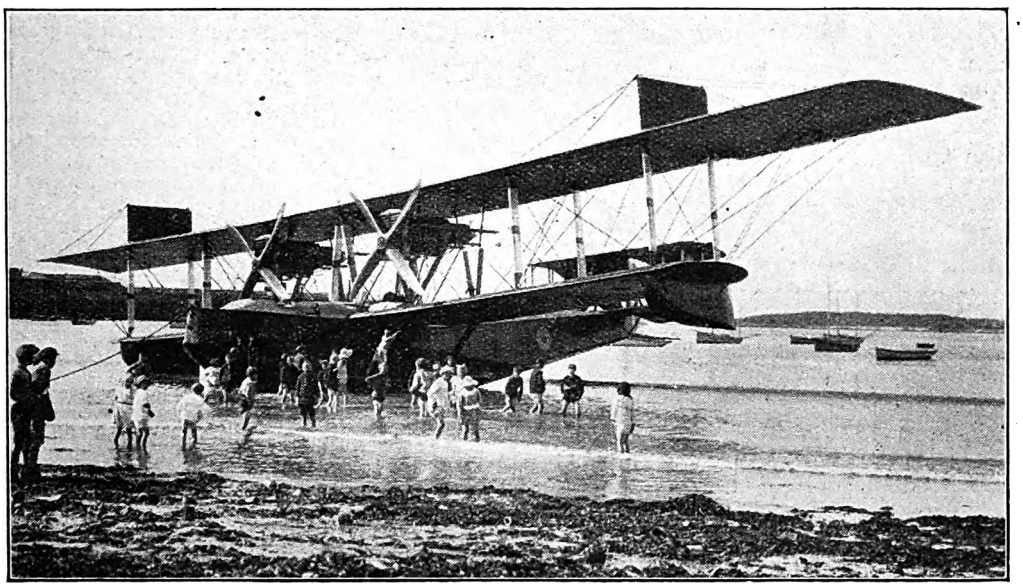

The "CROMARTY," the largest Seaplane afloat.—*Evening News, 30-8-22.*

1911

The First British Twin-Float Seaplane.

1920

The First British All-Metal Aeroplane.

1922

The Largest British Flying-Boat to be successfully flown.

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Monge single seater is equipped with a Leitner-Watts airscrew.

The enormous four-engined Schneider bomber was entirely equipped with Leitner-Watts airscrews, two 2-bladers being used for the front two engines and two 3-bladers on the rear engines.

Considering how strong a prejudice there is in France in favour of the exclusive use of French designs as well as of French construction, the prevalence of these airscrews at the Grand Palais is a striking tribute to the success with which Mr. Leitner has attacked the many difficult problems involved in the construction of metal airscrews.

AN INTERESTING ENGINE STARTER.

An engine starter of a quite simple type which appears to possess many practical advantages was exhibited at the Paris Show. This—which is known as the "Demarreur S.N.M."—somewhat resembles the well-known "Odier" starter in general design, but has the advantage that it does not depend for its motive power on a supply of compressed air.

It consists of a cylinder and piston, which drive by wire rope and pulleys the usual dog-clutch for engagement with the engine crankshaft. The cylinder is charged by an ordinary hand pump with an air and petrol explosive mixture, and this mixture is fired by a spark plug through the agency of the usual starting magneto.

The complete starter is quite compact, and can be fitted permanently inside the fuselage of any ordinary aeroplane. It can be adapted to any engine capable of being fitted with a starting handle.

THE INSTITUTION OF AERONAUTICAL ENGINEERS.

NOTICE OF ALTERATION.

A discussion on "Gliding" and "Gliders at Itford" will be held by the Institution of Aeronautical Engineers at the Engineers' Club, Coventry Street, W., at 6.30 p.m., on Friday, the 12th inst. Mr. W. O. Manning will lead the discussion, and it is expected that several of the pilots who took part in the Itford Gliding Competitions will be present. All interested are welcome to attend and join in the discussion.

The above will take the place of the paper which Major D. C. M. Hume was announced to read on that date, entitled "The Seaplane for Commercial Duties." This has been cancelled owing to Major Hume having gone to take up a post in Canada.

THE I NTERNATIONAL CONGRESS, 1923

The International Air Congress is to be held in London between June 25th and June 30th.

Mr. C. V. Allen having resigned Lieut.-Col. W. Lockwood Marsh, the Secretary of the Royal Aeronautical Society, who was at first appointed Technical Secretary to the Air Congress, has now been appointed General Secretary.

The organisation of the Congress is in the hands of an Executive Committee under Major-General Sir F. H. Sykes, formerly Controller-General of Civil Aviation.

It is stated that National Committees have been formed in several countries to prepare lists of names for membership of the Congress. Membership is limited to those countries which are members of the Federation Aéronautique Internationale or signatories to the International Air Convention. The subscription is to be £1, or its equivalent at the current rate of exchange, for a member and 10s. for an associate member "who must be a member of the family of a member."

So far it has not been stated precisely what advantages accrue to those who become members or associate members. The actual proceedings of such Congresses are as a rule reported at rather more than necessary length in the daily Press, considering how little space is given to much more important aeronautical matters, and the same sum of money expended in the form of a subscription to an adequate aeronautical journal would produce far more educative information at the price.

Personally one has never been able to see any particular advantage in these Congresses beyond the fact that aviation in general has and certain individuals in particular have obtained a considerable amount of free advertisement in the non-technical Press which they would not otherwise obtain. So far as the ideas produced at the Congress are concerned, either in the papers themselves or in the subsequent discussions, they are generally extremely ancient history to everybody who is actively concerned with aviation and as they are generally either uninteresting or incomprehensible to the people who are not already concerned with aviation the whole of the proceedings strike one as being waste of time and money.

Considered purely from the point of view of advertising aviation such a mass of matter is crammed into three or four days that it is impossible for either technical or non-technical papers to deal adequately even with the points which do matter and if the papers and the subsequent discussion were issued it is very doubtful whether any individual in these busy days of reconstruction would have time to read them.

A conference of the officials who actually control aviation in the different countries might be useful if held privately from time to time, but these over-advertised, over-populated conferences of more or less self-appointed people who have done little for aviation except talk about it are mere waste of the time and money of everybody who is compelled to be concerned with them.—C. G. G.

THE HARMONIOUS SMITHS.

Christmas Eve at the Cricklewood works of S. Smith and Sons (M.A.) Limited, the famous manufacturers of motor accessories, has always been devoted to merry-making and harmonious social intercourse between the management and the workers. This year however marked a still greater development in the social side of Smith's (M.A.). The whole of Friday afternoon Dec. 22 was devoted to a Children's Party given to the children of all the workers in the factory: altogether over 350 children were entertained to tea, followed by Punch and Judy and a very fine Marionette Show, and the orchestra played selections the whole afternoon. A huge Christmas tree loaded with presents and lit by a number of Smith Inspection Lamps stood in the large canteen, Father Christmas being played by Mr. B. Haviland, the Works Manager. Each child was presented with two or three presents from the tree, and before leaving received the usual oranges and nuts and a balloon.

Mr. Gordon Smith, Managing Director, with the Directors and Departmental Heads was present and all joined very heartily in the fun, demonstrating the spirit of goodwill that exists throughout the Smith organisation. The whole expense was borne by the directors, management and staff of the factory and sales department. Great credit is due to the popular Sports Secretary—Mr. E. G. Peskett—and members of the Organising Committee in making the whole day a complete success. Mention must also be made of Miss Wilson, Manageress of the Canteen, who organised the catering arrangements very thoroughly. At 18.00 hrs. the Children's Party finished and the evening ended with a dance. A number of musical turns were provided, and the evening closed with cheers for those responsible for the success of the day.

NAYLOR BROS.' ANNUAL GATHERING.

During November Naylor Brothers (London) Ltd. held their Annual Sales Conference at Slough, their representatives and their wives coming from all parts of the British Isles. Included in the programme of the Conference was a discussion of the sales programme including a complete survey of the firm's products, their methods of packing and distribution, advertising, costs, selling prices and other details. A demonstration was also given of the methods of manufacture of all the Naylor products and the results of the laboratory work which has taken place during the last year, Dr. H. H. Morgan spending more than two days showing the various tests to which he has subjected the firm's products.

The evenings were devoted to informal discussions on salesmanship and various technical points which had been brought to light during the tours of the works and laboratories.

At the end of the week a dinner was given by the Directors to about 60 members of the firm and their wives under the Chairmanship of Mr. H. Spencer Naylor, the Managing Director of the Company. In the course of a speech in which he proposed the health of "Our Representatives" Mr. Naylor said that in spite of taxation and other business worries the firm had had a very successful year and the volume of business showed a very satisfactory increase over previous figures for which he gave the representatives great credit. He went on to review the forthcoming publicity campaign of the National Federation of Paint, Varnish and Colour Manufacturers of which he is the Chairman of the London Branch.

Mr. Gilfrid G. Craig, a director of the Company, spoke of the splendid organisation and equipment of the factory and stated that he looked forward to the future with the greatest possible confidence.

Mr. H. G Fraser proposing the health of the Chairman and Directors said that the conferences were not only enjoyable but useful and helpful to the representatives. He also thanked Mr. S. E. George and Dr. H. H. Morgan for their demonstrations and educational talks about the laboratory tests and manufacturing methods of the firm.

RECEIVERSHIP.

EASTBOURNE AVIATION CO., LTD.—G. W. Plummer of 69, Terminus Road, Eastbourne, was appointed receiver on December 16th, 1922, under powers contained in debentures dated March 5th, 1920.

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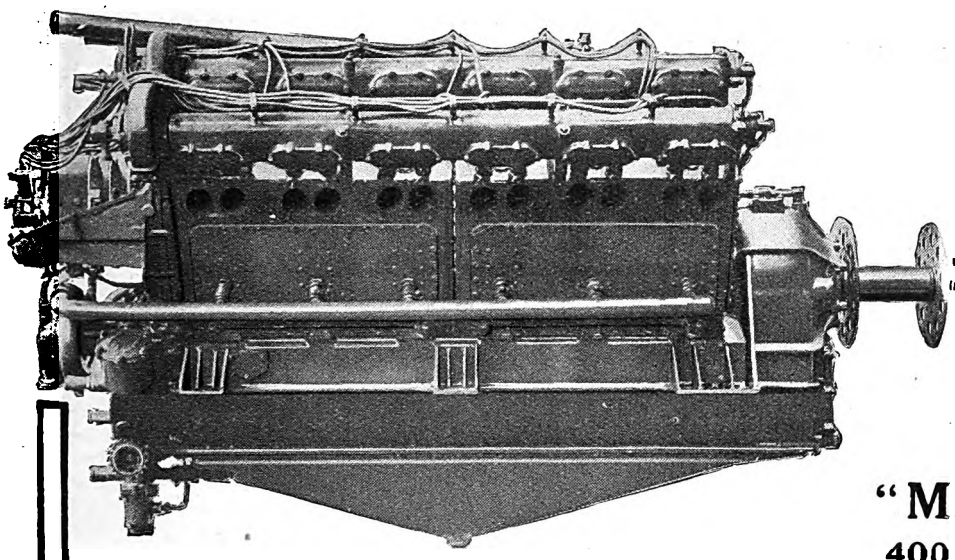

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AERO ENGINE
As supplied to the French Government.

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"DYAK"	100 h.p. 6-cylinder	"SIKH"	1000 h.p. 12-cylinder
"ARAB 2" (Direct Drive)	200 h.p. 8-cylinder	"MAORI"	275 h.p. 12-cylinder
"MANITOU" ..	300 h.p. 12-cylinder	"COSSACK" ..	350 h.p. 12-cylinder
"MATABELE" ..	400 h.p. 12-cylinder	"SIKH"	500 h.p. 6-cylinder

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. . . . *Southern Service & Repair Works*, 177, The Vale, Acton, W.3.
MANCHESTER . . *Showrooms* . . . . . 106, Deansgate.
. . . *Northern Service & Repair Works*, 288/294, Eccles New Rd., Weaste.
NEW YORK . . *Showrooms* . . . . . 25, West 57th Street.

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(*Continued from page 24.*)

A new D.H.18 was delivered by the de Havilland Aircraft Company to the Department of Civil Aviation.

Mr. Hinkler came up from Southampton to Croydon with a 504K Avro fitted with a Siddeley "Lynx" engine, the first seen of this interesting combination.

The first public view of the 1,000-h.p. Napier "Cub" was given on Feb. 16th when a number of M.P.'s and others visited the Napier works at Acton.

AERONAUTICS OVERSEAS.—On Feb. 25th M. Levavasseur, the famous designer of the "Antoinette" engine and monoplane, died in France at the age of 58.

MARCH, 1922.

SERVICE AERONAUTICS.—On March 1st there was published the Report of the Accidents Investigation Committee into the loss of R.38. This confirmed in essentials the Admiralty Report issued in January.

On Mar. 2nd a "token" supplementary estimate for the year 1921-22 was issued by the Air Ministry, the authority of Parliament being sought for the grant of certain further expenditure on certain Air Votes.

On Mar. 8th Mr. Gilbert asked the Secretary of State for Air how many airships were in possession of his department and what was to become of them. Capt. Guest replied that as it was not proposed to retain any of them for Air Force work in view of the present need for economy and of the inability of India and other Dominions to contribute towards their operation on Imperial air routes it had been decided to pass them all for disposal.

THE AEROPLANE of Mar. 8th dealt with the creation of the Civil Aviation Advisory Board as announced at the Air Conference, its aims and objects and its members being described therein.

On Mar. 9th questions were asked in the House of Commons about the amount of money spent on R.A.F. recruiting advertisements and the number of recruits obtained. Capt. Guest, replying, stated that the expenditure was £15,000 on posters, films, etc., and £3,000 on the Stationery Office Vote. As a result during the first 11 months of the year 6,320 recruits had been obtained.

On the same day there was a discussion on Air Attachés and their pay and it was stated by Capt. Guest that we had two such Attachés, one at Paris and one at Washington, who drew respectively £4 and £5 a day foreign allowance.

The debate on the R.A.F. in Iraq then began. Mr. Churchill stated that the Estimates for 1922-23, apart from special charges for the repatriation of troops, would not exceed £10,000,000. The R.A.F. being the biggest British force in the country, it was only right that the command in Iraq should follow the bulk of the forces there and that ancillary units should come within the general control of the air.

On Mar. 11th the R.A.F. Rugby Team was thoroughly well beaten by the Army at Leyton by four goals and a try (23 pts.) to a goal and a try (8 pts.).

On Mar. 16th the Royal Air Force received its Charter as the First Line of Defence of the British Isles. In THE AEROPLANE of Mar. 22nd a leader dealt with this subject exposing the attack on the R.A.F. made by Admiral Sir Reginald Hall on Mar. 16th in the course of the debate on the Navy Estimates and the blankness of its reception in the light of Mr. Chamberlain's official defence of the R.A.F.

On Mar. 17th the Air Estimates for the financial year 1922-23 were issued. With the Estimates was issued a memorandum by the Secretary of State for Air which contained figures and facts quite as important as the Estimates themselves. This memorandum is dealt with in THE AEROPLANE of Mar. 22nd, the debate on the Air Estimates which took place on Mar. 21st being dealt with in the issue of April 5th.

During the last week in March there appeared in the *Times* a series of articles entitled "Our Future in the Air" by Brig.-General P. R. C. Groves, late R.A.F., and concurrently in various other papers there appeared articles dealing more or less with the same subject, all emphasising the importance of an adequate Air Force against attack by Air. General Groves' articles unfortunately contained various fallacies.

On Mar. 21st the Air Ministry announced that Sir Percy Cox, High Commissioner for Iraq, made his first inspection by air of the part of the country lying along the Euphrates accompanied by his staff and an R.A.F. Guard of Honour. The party left Baghdad in three Vickers "Vernons" with an air escort of 12 machines.

On Mar. 31st it was announced by the Air Ministry that Major-General Sir Frederick Sykes, C.B.E., K.C.B., C.M.G., had resigned his appointment as Controller-General of Civil Aviation on the expiration of the term for which he was originally appointed.

CIVIL AVIATION.—In March a number of Greek Naval and Military officers visited the Aircraft Disposal Company and were given an exhibition of scrapping in the air.

On Mar. 8th in a leading article special reference was made to the latest success of the Handley Page Slotted Wing and to the futility of helicopters.

The Napier Bristol 10-seater operated by Handley Page Transport made its first trip to Paris.

On Mar. 6th Capt. Rex Stocken flew from London to Brussels on an Avro in 1 hr. 57 min.

The first of a series of night-flying tests were made at Croydon by a Handley Page 0/400s. from the R.A.F. Station at Biggin Hill.

Some D.H.9s. with Mercédés engines were erected by the Aircraft Disposals Company for Sweden.

Mr. Gordon Olley took the 0/400 Handley Page fitted with Bristol "Jupiter" engines to Paris for a demonstration before the French authorities.

On Mar. 28th Handley Page Transport and the Instone Air Line in concert celebrated one year of subsidisation by a joint lunch.

On Mar. 27th the first D.H.34 was successfully tested at Stag Lane by Mr. Alan Cobham.

AERONAUTICS OVERSEAS.—In THE AEROPLANE of Mar. 1st there appeared a leader dealing with the loss of the U.S. Naval Airship "Roma" and the probable explanation thereof.

On Mar. 1st some indication was given of the trade which was being opened between the British Aircraft Industry and the Bolshevik Government of Russia.

An illustration of a new Japanese aeroplane built by the Mitsubishi Dockyard Co. to the design of English engineers appears in THE AEROPLANE of Mar. 1st. The machine, a single-seater fighter with a 300-h.p. Japanese-built Hispano-Suiza, is reported to have a high performance.

It is of interest to note that at the Gliding Competition held at Gstaad during this month the longest flight was a duration of 42.2 seconds.

On March 1st Capitao-Tenente Saccadura-Cabral and Capitao Gago-Coutinho of the Portuguese Navy started from Lisbon on a Fairey seaplane (Rolls-Royce engine) to fly across the Atlantic.

R.A.F. INTELLIGENCE.

Appointments.

From *The London Gazette*.—Air Ministry, Jan. 5th, R.A.F. General Duties Branch: F/O. W. K. Mercer is granted a permanent commission in rank stated Oct. 24/19 (since promoted); notification of Oct. 24/19 appointing him to a short service commission is cancelled.

The following correction to an appointment to the Order of the British Empire in the New Year honours list is notified: For F/Lt. Horace George Brown, R.A.F., read F/Lt. Horace George Bowen, R.A.F.

Waziristan Operations.

The *Times* correspondent in a communication from Lahore dated Jan. 6th states that:—The bombing operations against the Mahsud raiders have had a sobering effect, much damage having been caused to their flocks and property.

The cold is intense and snow has fallen in many places, and as the villages are cleared when the aeroplanes arrive and the inhabitants seek shelter in the open there is much hardship and discomfort.

The notorious Jalal Khels, who recently abducted a captain and party on the Dera Ismail Khan road, and who have frequently refused to come to terms, are now talking peace.

The R.A.F. Cadet College.

The Civil Service Commissioners declare the following to be the successful candidates at the competitive examination held in November, 1922, for Cadetships at the R.A.F. Cadet College, but their admission is conditional on their having passed the medical examination.

*Campbell, J. H. McN., 10,233; *Harris, S. H. V., 9,018; Beardsworth, G. B., 8,567; *Montgomery, A. H., 8,314; *Hayes, G. W., 7,851; *Walker, N. C., 7,244; *Treseder, K. H., 7,177; *Burridge, D. W., 7,104; *Franks, J. G., 6,899; Willetts, A. H., 6,857; Beamish, G. R., 6,564; *Bernard, P. R. G., 6,537; Danbury, B. A. C., 6,439; *Scott, I. M., 6,289; *Cox, G. F. G., 5,739; Allinson, N. S., 5,583; Addams, J. R., 5,052; *Ford, R. J. A., 5,043.

King's cadet who has qualified: Hayes, M. E. de L.

* These candidates have received marks for military efficiency.

The highest number of marks gained by a candidate for admission to the R.M.C. Sandhurst was 8,728 and for the R.M.A. Woolwich 12,416.

Mr. Campbell would have been 20th in Woolwich and Mr. Harris 48th, or last but four. On the other hand 19 people got into Sandhurst who would not have qualified for Cranwell, the lowest Sandhurst marks being 4,605.

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On August 7th, for the second time in succession, B.T.H. Magnetos helped Mr. J. H. James to secure the Aerial Derby Trophy for First Place.

His machine—"Mars I"—The Gloucestershire Aircraft Company's biplane, popularly known as the "Bamel," has a 450 H.P. Napier Lion engine, equipped with a **B.T.H. A.V. 12 Magneto** and this year averaged 179½ m.p.h., being 16 m.p.h. better than last year.

B.T.H. Magneto Successes.

Second Place was gained by Mr. R. A. de H. Haig, flying a Bristol Bullet machine, equipped with a 440 H.P. Bristol Jupiter engine and a **B.T.H. A.V. 9 Magneto.**

Third Place was secured by Mr. F. P. Raynham, in a Martinsyde F. 6 machine, equipped with a 200 H.P. Wolseley Viper engine and a **B.T.H. A.V. 8 Magneto.**

B.T.H. Magnetos were also fitted to the machines gaining **Second, Third** and **Fourth** places in the 1922 **Aerial Derby Handicap** and to the machines gaining **First, Second** and **Third** places in the **August Open Handicap.**

This is the fourth successive Aerial Derby in which B.T.H. Magnetos have been fitted to machines gaining the First and Second places!

The British Thomson-Houston Co., Ltd.,

Lower Ford Street, :: B T-H :: :: :: Coventry.

F-ADAY F-A[illegible]
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F-[illegible]
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F-A[illegible]
F-FA[illegible]
F-FHI[illegible]
F-UHM[illegible]
F-YHM[illegible]
F-ADAI
F-ADAU
F-ADBM
F-ADBP

C.M.A. Air Lines is the British title of the Compagnie des Messageries Aériennes, whose head office is at 2, Rue Galilee, Paris. The Company was originally founded early in 1919, by M. Louis Breguet, for the transport of goods from Paris to Lille, the ground communications having been so much disturbed by the European War. This line, which was the first commercial aviation service in the world, was soon extended to Brussels and the line from Paris to Brussels has been maintained by the Company ever since.

In September, 1919, a service between London and Paris was inaugurated in conjunction with Handley Page Transport, Ltd. This was originally operated three times a week each way, but later, when the two Companies separated, a daily service was commenced, which has now been extended to a thrice daily service. Compagnie Générale By an arrangement with the Compagnie Générale Transatlantique a service is run to connect with the arrival and departure of this Company's sailings between Le Havre and New York. This is the first occasion on which a large shipping company has recognised the necessity of using commercial aviation in its transport policy.

The Company's service has now reduced the time of transit between London and Paris to two and a-half hours; between Paris and Brussels to one and a-quarter hours; between Paris and Amsterdam to two hours and a-quarter hours; between Brussels and Amsterdam to two hours and between Brussels to run direct from London A line has been inaugurated to run direct from London to Marseilles, calling at Paris and Lyons and connecting with the Steamship Lines to India and the East. This brings Marseilles within eight hours' reach of London and Lyons within six and a-half hours.

The C.M.A. Passenger Service is maintained by twin tractor Farman Goliath Biplanes, fitted with two 300-h.p. Renault Engines and with a seating capacity for 12 passengers, pilot and mechanic. This machine has a wing-span of 92 ft., a length of 49 ft. 6 in. and a height of 16 ft. Its cruising speed is 93 m.p.h. The freight, mail and newspaper services utilise the smaller type of single-engined Spad and Breguet.

The Compagnie des Messageries Aériennes is an association of Aerial Transport, and among its Board of Directors appear the well-known names of Messrs. Blériot, Breguet, Caudron, Farman, Morane, Luquet de St. Germain and Renault.—*Extract from R.Ae.C. Year Book.*

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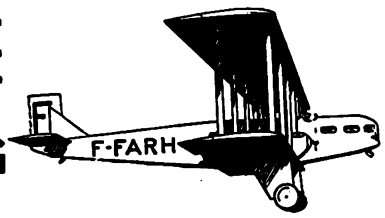

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THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

R.A.F. Football Association.

Two further trial matches for the Air Force XI. have been arranged for Jan. 17th against the Civil Service at Henlow, and Jan. 24th against Woolwich Arsenal at High Wycombe.

March 24th has now been fixed for the match against the Royal Navy at Aylesbury, and the Army match will be played at Chatham on April 11th.

R.A.F. Depot.

RUGBY :—Results :—Saracens (won 17—3); St. Thomas' Hospital "A" (won 7—0); Household Brigade (won 15—8); Twickenham (lost 0—19).

ASSOCIATION :—December has been a bad month for the Depot XI., for only one game was won, and one drawn, out of a total of 12 played. Constant change of personnel has made it impossible to field the same team for two matches running, but the side is now improving.

Results :—Harrow Weald (lost 1—2); Marlow (lost 1—4); Heston Sports (lost 1—2); Harlesden (lost 0—5); Deerfield Athletic (lost 0—1); Harrow Gas Works (lost 1—4); Harrow Weald (lost 0—3); Hounslow (lost 0—9); Staines Lagonda (lost 0—3); Hounslow (lost 2—4); Harrow L. and R.O.B. (drawn 1—1); Yiewsley (won 3—2).

HOCKEY :—Results :—Vickers (won 4—2); Crouch End (lost 2—3); Wembley (lost 3—5); St. Bartholomew's Hospital (lost 1—3); Great Western Railway (lost 1—3); and Inland Area H.Q. (beat Kenley 3—1).

INTER UNIT CUP COMPETITION :—M.T.R.D. (Shrewsbury) met R.A.F. (Spittlegate) for the third time at Uxbridge, the two previous matches having been drawn. In this case M.T.R.D. was successful by 5—0.

BOXING :—A tournament in aid of St. Mary's School Fund was held in the gymnasium on Dec. 13th. In addition to several contests between outside supporters a Novices' Welter Weight Competition was held with the following results : A/C. Drew knocked out A/C. Crabb in the first round. A/C. Rogers beat A/C. McGregor on points. A/C. Carter beat A/C. Raynor on points. Semi-final :—A/C. Carter beat A/C. Rogers on points. Final :—A/C. Carter beat A/C. Drew on points. A/C. Carter was at a disadvantage in the final having sustained an injury to the eye.

A six-rounds contest between A/C. Mullins and A/C. Stewart resulted in a win for the former, who continues to show imrovement. A/C. Moss took the ring at a moment's notice with Bill Thake of Canning Town and despite a long absence from boxing displayed excellent form. A very satisfactory meeting from which the fund should considerably benefit, concluded with an amusing display of blindfold boxing by the School of Physical Training.

[Note.]

All R.A.F. Sports News for inclusion in the R.A.F. Sports Bulletin, including notes hitherto sent to THE AEROPLANE direct, should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry, Kingsway, W.C.2.

R.A.F. v. Leicester.

[Unofficial.]

The R.A.F. were beaten at Leicester by Leicester on January 6th by 2 placed goals and a dropped goal (14 points) to a try (3 points). The R.A.F. forwards were good, their pace and footwork overwhelming Leicester on several occasions. Their forward work however was discounted by lack of finish in the back division. At half-time Leicester were leading by ten points but soon afterwards the R.A.F. carried the play into the Leicester line and following a hard tussle F/Lt. Usher forced his way over. F/O. Harcourt-Vernon failed to convert. Leicester subsequently dropped a goal The R.A.F. team were :—L/AC. Runham, back; F/O. Jones, F/Lt. Neale, F/O. Flint, and F/Lt. Riddle, three-quarter backs; S/Ldr. Russell and F/O. Baker, half-backs; F/O. Adams, Cpl. Biggs, F/O. Harcourt-Vernon, S/Ldr. Stephens, F/Lt. Usher, F/O. Chick, AC. Collins and P/O. Coventry, forwards.

THE WORLD'S SPEED.

On December 31st at Istres, near Marseilles, M. Sadi Lecointe covered a kilometre course four times, at an average of 348.02 kilometres per hour thus beating his previous record of 341.239 kms.p.h., and that of Mr. James in the Gloucestershire Co.'s "Bamel" of 341.423 kms.p.h. He was flying a Nieuport-Delage "Sesquiplan" similar to the one he flew in the last Coupe Deutsch, with minor modifications.

As the record set up by Brig.-Gen. Mitchell of the U.S. Army Air Service of 361.28 km.p.h. on the Curtiss Army Racer has now been homologated M. Sadi Lecointe is still not the holder of the World's Speed record, but at the same time he has established the fastest speed made in Europe during 1922, beating James' speed by 6.597 k.p.h.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.
ANALYSIS OF FIGURES.

For week ending Jan. 7th.

LONDON—PARIS :

Handley Page Transport, Ltd., machines 8*, passengers 57. C.M.A. Air Lines, machines 5†, passengers 4. Cie. Grands Express Aeriens, machines 1*, passengers 6. Total machines 14, passengers 67.

LONDON—OSTENDE—COLOGNE :

Instone Air Line, Ltd., machines 6*, passengers 6.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 14, passengers, Manchester-London, 22, London-Amsterdam 4.

LONDON—ROTTERDAM :

K.L.M., machines 5, passengers 4.

SPECIAL MACHINES. LONDON—BERLIN.

Deutsche Luft Reederei, machines 2, passengers 6.

Total number of trips by British machines : 28, carrying 89 pas.

Total number of trips by foreign machines : 13, carrying 20 pas.

Trips per day.—Monday, 7; Tuesday, 2; Wednesday, 12; Thursday, 6; Friday, 3; Saturday, 11; Sunday, 0.

STATISTICS.

Machines, 41; Passengers, 109; Crews, 80; Total Personnel, 189.

Corresponding week last year :—

Machines, 15; Passengers, 36; Crews, 23; Total Personnel, 59.

Corresponding week, 1921 :—

Machines, 21; Passengers, 15; Crews, 25; Total Personnel, 40.

* These machines also carry loads of freight.

† Some machines are freighters only. C.M.A Air Lines run an early morning machine carrying newspapers daily from Lympne to Paris.

NOTES OF THE WEEK.

THE BUSY A.D.C.

Mr. Perry was testing a D.H.9 for the Aircraft Disposal Company on Wednesday and on Friday Capt. Stocken was doing the same. On Saturday Mr. Piercey left for Ireland on a similar machine.

A short time ago when Capt. Stocken and Mr. Perry were taking some D.H.9s across the visibility was so good that they were able to see the Wicklow Mountains soon after leaving Holyhead.

A D.H.9a with a Rolls-Royce engine is being fitted up with two Lamblin radiators and a full equipment of guns (including one firing through the bottom of the fuselage). This machine is to go to Spain to take part in a race there.

There is also a batch of D.H.9a's with Liberty's being prepared by the A.D.C. for the Air Ministry.

HANDLEY PAGE'S GOOD YEAR.

Handley Page Transport Ltd. have had a very successful year on the whole. Their flying time on the London-Paris route has been 1,899 hours 14 mins. in which they have put up an approximate mileage of 153,739. The total number of passengers carried on the London-Paris route has been 10,026, of these 7,566 have been carried by British machines and 2,400 by French. Of the British total 4,008 have been carried by Handley Page Transport Ltd. Moreover 460 passengers have been turned down for various reasons chiefly through lack of accommodation.

The total weight of freight mail and baggage carried in the same period by H.P.T. Ltd. has been 215,500 lbs.

There have been no accidents of any kind to Handley Page machines and the damage to aircraft passengers and freight has been nil. So there have been no claims on the insurance company.

All of this speaks volumes for the organisation of the firm and for the care and skill of the pilots. Each of the three W.8b's has completed just on 400 hours with an average consumption of 18 gallons of petrol per engine per hour.

Mr. Cogni has been responsible for the traffic organisation and Mr. Savage for the technical side and no doubt this year under their able guidance Handley Page Transport will reach an even higher level of efficiency.

A BELGIAN SERVICE AGAIN.

The Instone Air Line have now completed arrangements to land at the Ostende Aerodrome *en route* for Cologne thus re-opening air communication with Belgium. Presumably this will continue until the Belgian authorities dig up the Ostende Aerodrome, and after that they may have to dig up the sands of the "plage" if they want to stop the Instone service.

Mr. Loader of the Lep Aerial Travel Bureau informs one that the single fare to Ostende is only £3 and there being a good train connection to Brussels, this materially shortens the trip between London and Brussels especially as the aerodrome at Ostende is near the railway station.

DAIMLER DIPLOMACY.

The Daimler Airway have had a good week on both the Manchester and Amsterdam air routes. Chief interest this week has naturally centred on their guests the directors of the German Aero-Union plus Deutsche Luft Reederei plus Aero-Lloyd Combine, which really means the Hamburg-

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Extract from Recent Parliamentary Report.

BRITISH AEROPLANE RECORDS.

"Sir Samuel Hoare, Secretary of State for Air, informed Sir J. Norton-Griffiths that the greatest total distance flown by any British aeroplane engaged on the passenger air routes was 100,393 miles by a D.H.34 aeroplane, operated by the Daimler Hire Company. The next best record was held by an aeroplane belonging to the Air Ministry, type D.H.18, which had been used by various firms, but chiefly by the Instone Air Line. This aeroplane had flown approximately 70,000 miles."

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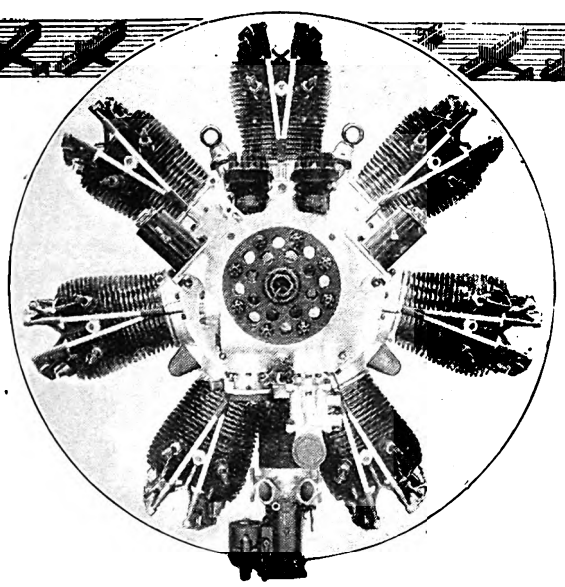

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Aircraft Engines ARMSTRONG SIDDELEY

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Amerika plus Norddeutscher-Lloyd steamship lines. They arrived on Monday of last week in an all-metal Dornier monoplane which is fully described and illustrated in this issue of THE AEROPLANE.

The machine was much admired at Croydon. One person seemed to think that it was made of meccano and another suggested that for the wing and fuselage covering the Germans had utilised old Bully-Beef tins, but it was generally agreed that it was a very fine proposition indeed and would need very little care and maintenance. It strikes one as being structurally a cross between the Short Bros'. "Silver Streak," the Eiffel Tower, a Ford and the late lamented editorial "Merc."

On Thursday morning Sir Sefton Brancker, General Festing, Col. Edwards (Assistant Director of Civil Aviation), the German Ambassador and the General Manager of the Daimler Airway were taken for flights in the machine. Later in the morning Major Wronsky and Captain Mackenthun, two of the directors of the Aero-Lloyd were taken for a flight in one of the Daimler D.H.34s with Napier engines after which they returned to Berlin in the Dornier *via* Amsterdam.

Another all-metal German machine, a Junkers should be at Croydon by the time this is in print. It is being brought over by arrangement with the Royal Aeronautical Society in order that members of that august body may have a chance of examining metal construction.—G. D.

K.L.M. Regularity.

The following letter has been received :—

Dear Sir,—The attached table showing the K.L.M. record on the London-Amsterdam route during the last 9 months of 1922 may possibly prove of interest.

ROYAL DUTCH AIR SERVICE.
(Signed) H. SPRY LEVERTON.

TABLE OF FLIGHTS SCHEDULED AND FLIGHTS COMPLETED.

April.—Flts. : sch. 22. Flts. : comp. 21. May.—Flts. : sch. 83. Flts. : comp. 72. June.—Flts. : sch. 100. Flts. : comp. 89. July.—Flts. : sch. 104. Flts : comp. 95. August.—Flts. : sch. 108. Flts. : comp. 105. September.—Flts. : sch. 56. Flts. : comp. 50. October.—Flts. : sch. 52. Flts. : comp. 51. November.—Flts. : sch. 52. Flts. : comp. 37. December.—Flts. : sch. 48. Flts. : comp. 41.

Of the flights completed all but 10 were completed on the same day, these 10 being completed on the following day.

WHO IS FOR "SAFETY IN THE AIR"?

Neither the Finest Engines, the Finest Machine, the Finest Pilot, nor the Finest Mechanics Rule Out Accidents in the Air.

In the Grand Prix de Paris the French Airman Poiré and his two mechanics were killed on the 14th instant when flying the Caudron Biplane C.74—a huge passenger-carrying aeroplane with four motors of 300 horse-power.

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The CUSTOM of the time—which *rules out* the carrying of Parachutes in Competitions—is responsible for the death of these men, for no authority can *rule out* accidents.
It is for the Aero Club de France and the Royal Aero Club of Great Britain to take the lead in insisting that in all International Competitions Parachutes must be carried on every machine for every person on board

Make them *COMPULSORY* and the sting of the innovation will not then rest on the Competitors If all are *COMPELLED* to carry Parachutes no Competitor is thereby prejudiced.

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Telephone: Paddington 6332.
Telegraphic and Cable Address: "Savemalivo, London."

D.H. V. H.P.

On Saturday, Jan. 6th, at Stag Lane aerodrome two teams representing the De Havilland Aircraft Co. Ltd. and Handley Page Ltd. met in a friendly football match. Shortly after the start, one of the D.H. team was unfortunate enough to break his leg, how, one knows not, and this held up the play. Which shows the evils of fast versus slow landings.

However, on the return of the referee, Mr. Alan Cobham, who was one of the bearer party and after he had discovered his whistle, play was resumed.

The D.H. team, which included Messrs. St. Barbe, Broad, C. D. Barnard and Wilson, appeared to be superior to the H.P. team collectively, but the latter possessed two men in their forward line who played in excellent formation and accomplished most of the H.P. attack, thereby allowing H.P.'s to get away with a drawn game. The referee having lost his watch on the field of play there was no half-time so that all goals were scored in the only half.

The final score was two goals to one goal and one dropped goal to use "Rugger" parlance, this effort being scored from a few yards off the D.H. goal, the ball soaring up into the "blue" and dropping but a few inches inside the goal line to the surprise of the goalkeeper who was apparently put off by a sort of mass meeting in front of his goal.

It was regretted that Mr. Handley-Page was not playing but rumour has it that he was held up by the non-appearance of his air-taxi. Mr. Meredith, however, led the H.P. bombardment protection troops at centre-half.

On the whole the game was most enjoyable, and infinitely more amusing to watch than those games wherein the teams are composed of "wage-slaves" whose directors buy and sell them for the benefit of the club's balance-sheet.—L. B.

PETER PAN, MARK II.

His many friends will be sorry to hear that Mr. A. M. S. Solomon of D. Napier and Son Ltd., has for some time been laid up with synovitis. He has come to the conclusion that the cause of his illness is due to the fact that he saw in THE AEROPLANE that he had been with Napiers for more than 127 years. However though most things in THE AEROPLANE (outside the Leader, The Technical Supplement and the R.A.F. Intelligence) are almost entirely accurate one thinks that the statements concerning Mr. Solomon's age were slightly inaccurate as he does not look a day more than 19.

Everybody will wish him a speedy recovery and a riotous and prosperous New Year.—G. D.

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Edited by C. Grey

WEDNESDAY, JAN. 17, 1923.

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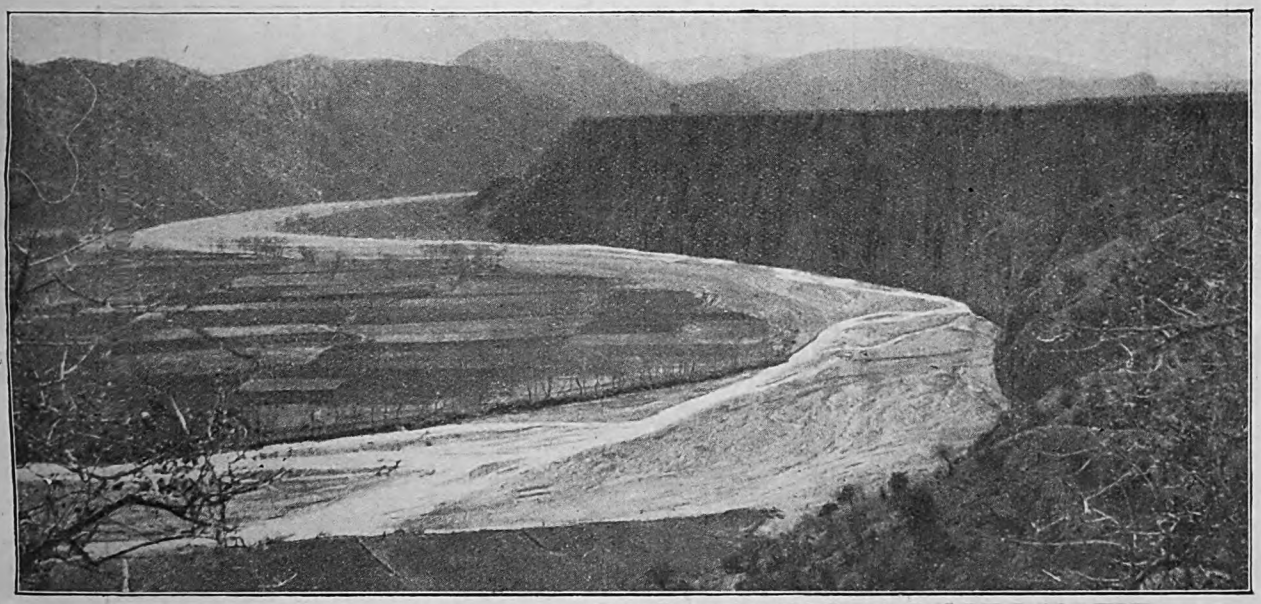
THE RIVER WALL.



AN UNPLEASANT COUNTRY:—The Toshi River, as seen from an R.A.F. aeroplane. A specimen of the country over which the R.A.F. works in Indian Frontier Wars.

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JAN. 17. 1923.

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ON 1922.—*continued.*

CIVIL AVIATION.

An Allegory.

There is a story going the rounds at the moment which somehow seems to apply to British Aviation. It runs thus:

A certain man had two friends who died. After a course of Sir Oliver Lodge, Sir Arthur Conan Doyle, Mother Shipton, Old Moore's Almanac and other authorities on the occult he managed to get into psychic touch with them. He found his friend Smith in Heaven and asked him how things were with him. Smith replied:—"Oh! Of course everything is lovely here. Wonderful climate and scenery, and all that, and lots of quite the best people. But you know there is one thing that's a trifle trying. We never have a moment to ourselves. What with choir practices and performances, and polishing our golden harps and crowns and whatnots there simply isn't a spare minute in the day!"

So the man switched off and tuned in for his other friend Jones, who wasn't in Heaven. Jones, in reply to kind inquiries, said:—"Well! It's true the climate is a bit hot and stuffy, and the work is rather dirty, and some of the people one has to work with aren't quite nice. But there is one great consolation about it. Nobody ever does more than a couple of hours' work a day. A convinced Trade Unionist would think he was in Heaven."

"That's queer," said the man, "I've just been talking to Smith, who *is* in Heaven, and he complains that they have to work so hard there that he never has a minute to himself."

"Very likely," replied Jones, "But think what a Hell of a staff we've got!"

Of course one would never even suggest that the amiable officials in the Department of Civil Aviation only do a couple of hours' work a day. But when one thinks of the comparatively small staff on the military side of the Air Ministry striving mightily till late hours of the night to keep pace with the urgent needs of the R.A.F. and then contemplates the actual progress of Civil Aviation in 1922 which has produced a state of affairs in which somewhere between twenty and thirty officials (what with directors, deputy-directors, C.A.T.Os, meteorologists, clerks, typists, aerodrome porters, light-house keepers, wireless operators, custom-house officers, rocket-firers, baggage checkers, examiners of ground engineers, stress-calculators and various assorted other people) exist to administrate each individual passenger across the Channel one cannot help feeling that there is at least an adequately large staff for the amount of work to be done.

The explanation simply is that the organisation is there in the Department of Civil Aviation to handle several thousands of machines and several millions of passengers per annum as soon as our aircraft constructors produce commercial aeroplanes and as soon as the British Public accepts flying as an ordinary method of transport. So when the boom in civil aviation arrives the Air Ministry will know how to handle it.

The Difficulties of the Year.

During 1922 Civil Aviation has laboured under difficulties perhaps even greater than those of earlier years. In the very beginning firms like the Airco and Handley Page Transport had money to burn so-to-speak, and they burnt it. In 1920-21 when that evil thing the subsidy was introduced things had come to a very low ebb and so when air-line work was revived with the help of the subsidy nobody expected very much and nobody was disappointed. But in 1922 some people really began to hope that air transport might conceivably develop into a commercial proposition and they were very disappointed indeed.

The machines were there but the passengers were not. It is true that on all but a very few weeks in 1922 the number of passengers carried across the Channel was higher than that for the corresponding week in 1921, but the increase was not worth considering from the point of view of serious commercial transport. And such passengers as did use the air lines were of precious little use.

Most of the passengers were merely joy-riders, people with money who were not in a hurry and did not mind if they were hung up for a day by a forced landing so long as they could announce to admiring friends on returning to N'York, or Oshkosh, Wis., or Malodorato, Mexico, that they had flown from London to Paris or *vice versa*. Some few travelled by air because they liked it. A fair number (mostly newspaper people) did so because they could touch the air lines for free passes which could not be got from the railway companies. And a practically negligible number went by air because they were in a hurry.

The truth of the matter is that people will not travel by air until they can do so as cheaply and as safely as by rail and boat. And that time has not yet arrived.

The British Lion's Share.

How much all the French talk about their air lines is worth may be judged by the recent publication of figures for the traffic at the Paris terminal aerodrome of Le Bourgêt on which all the French air lines of any importance are concentrated. The French official figures state that 18,909 passengers were carried in and out of Le Bourgêt altogether. It is not quite certain whether this figure includes air-line mechanics and officials or whether it is confined to *bona-fide* paying passengers, but one does not imagine that the French are likely to minimise their passenger traffic by excluding anybody who could possibly be included.

Against this figure, which at first may appear to be large seeing that it means an average of about 360 passengers a week, it is well to put up the British figures for the London-Paris air route alone. This shows 10,026 passengers carried to or from London and Paris. That means that considerably over half the total passenger traffic at Le Bourgêt is between London and Paris. The other less-than-half is made up on the much advertised Paris-Amsterdam, Paris-Brussels, Paris-Strasbourg, Paris-Warsaw, Paris-Constantinople, Paris-Lausanne, Paris-Marseilles and Paris-Cherbourg services.

A still more significant fact is that out of the 10,026 London-Paris passengers 7,566 were carried on British machines. That is to say something between three-eighths and a-half of the total number of passengers handled at Le Bourgêt were conveyed in English aeroplanes.

Considering the small subsidy paid by the British Government compared with the enormous subsidy paid by the French Government it would seem that the figures for the English air lines are at least creditable to English enterprise. They appear to indicate that we shall in due course acquire most of the world's air-borne traffic just as in the past we have acquired most of the world's sea-borne traffic.

The Newspaper Affair.

For a period in 1922 useful work was done in conveying English newspapers to the Continent by air. The Daimler Company (from Croydon to Paris) and the de Havilland Company (from Lympne to Ostende) delivered newspapers at the Continental termini half a day before they could get there by sea and land. This was very good from the political point of view, but such work can never be a commercial proposition until return loads back to England can be guaranteed.

Nevertheless, if we taxpayers are to be soaked for a subsidy it would be better to spend it on genuinely useful propagandist work of that kind than on providing joy-rides for foreigners. Let anybody who likes have the passenger traffic so long as we can have the mail, newspaper and parcel traffic. Every railway and shipping manager knows that it is the freight rates which pay, not the passenger rates. And one cannot see why air transport should ultimately differ from other methods of transport in this basic fact, even though at the moment it may be easier to acquire, collect and handle 180 lbs. of passenger than 180 lbs. of goods.

The Creation of Monopolies.

Whether the policy of cutting up the three main air routes into monopoly lines so far as the subsidy is concerned is going to improve matters one has very grave doubts, though Sir Sefton Brancker deserves every credit for his quickness of decision in settling the question of cut-throat competition

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when it was raised by the air lines themselves. Somehow it reminds one of the action of one of the railways serving North London when a number of the people who used a big suburban station wrote and complained about the overcrowding of the 9.10 a.m. train. The railway replied by taking that train off the service.

The explanation was quite simple. The 9.10 suited all the people who had to get to their offices between 9.30 and 10.00 a.m. When it was stopped the people who had to be in by 9.30 caught the 8.50 and those who did not care so long as they got in by 10.00 caught the 9.30, and so the 8.50 and 9.30 which previously had run nearly empty were just comfortably filled and the railway company saved the cost of one train.

Somewhat similarly the present arrangement may not be so comfortable for some of the lines but it is in a way more economical and in the end it may prove to be more commercial, especially if some really intelligent person produces a really commercial aeroplane and starts running a really commercial unsubsidised air line along the routes which have been lighted and buoyed as it were by the subsidised lines.

To the extent that the subsidy is enabling the air lines to carry on uncommercial services and so discover empirically (otherwise by trial and error or by rule of thumb) how not to run an air line it is being spent usefully. It is at any rate money spent on experiment and research and so may be regarded as being just as usefully spent as that absorbed in such quantities by the Royal Aircraft Establishment at Farnborough and by the wind-tunnel experts at the National Physical Laboratory and by the subsidised scientists at South Kensington who are so useful in proving why things work after everybody has proved that they do work.

Ultimate Objectives.

It may be taken that the present lines to Paris, Köln and Amsterdam are only what shooting people call "sighters" and that their ultimate aim is at something considerably further afield. The Daimler Airway's policy is very obviously to secure the mail and parcel and passenger traffic with Berlin and the Baltic States, an area which has vast possibilities and may be the first of all to pay its way if only German trade is allowed to re-establish itself. The recent visit of the Hamburg-America and Norddeutscher-Lloyd representatives is highly significant.

The Instone Line to Cologne points more towards Vienna, Constantinople and the Middle East. The other day our only English *aviatrice*, Mrs. Oliver Atkey, touring in Syria and Palestine found largely displayed in the hotel at Baalbêk (which one gathers is where Elijah worked the petroleum deal on the priests of Baal) a poster of the Instone Air Line, which would seem to indicate that each stage beyond Köln will be, as the popular hymn says, "a day's march nearer home."

The Handley Page Transport Company's limited objectives would appear to be the Riviera and perhaps Switzerland, and the ultimate objective India and the Far East, by way of a big flying-boat line to Egypt or Palestine.

Matters of Finance.

So long as we regard these air lines simply as huge experiments it is possible to approve the subsidy scheme, but it is to be hoped that the closest watch is kept at the Air Ministry on the method by which the lines spend their subsidies. It is quite reasonable that the subsidies should recompense the lines for actual losses, but extreme care should be taken to assure that the money which is lost in running the air lines as such does not go to enrich somebody else,

Both in workshop and office dealings there are many opportunities for leakage unless accounts are most carefully supervised. And it seems that economies might be effected in numerous ways other than by cutting the wages of pilots, mechanics and other employees. For one thing it is fairly certain that petrol and oil bills might be considerably reduced if combined pressure were put on oil firms. Everybod. in aviation is working for less money than they are worth and all aircraft firms are losing money. The only people who make profits out of aviation are the petrol people.

The Unsubsidised Pioneers.

Personally one thinks that the most valuable propaganda for civil aviation has been done by the unsubsidised firms. The general public has been far more impressed by the collection and distribution by air of photographs, kinema films and so forth by the De Havilland Company than by all the work of all the air lines put together. A film of the Derby shown in Glasgow the same night impresses thousands of people with the value of air transport whereas all the figures for cross-Channel and other flying issued by the Air Ministry and spouted by officials to semi-comatose City men after dinner produce no appreciable effect whatever.

Little concerns like the Berkshire Aviation Co. Ltd., the Berkshire Aviation Tour, the Surrey Flying Services, the Manchester Aviation Co., and others still less known to our circumscribed metropolitanism, all hanging onto existence by the skin of their teeth, are educating the English people to understand flying and are accustoming them to being in the air. One believes that Mr. Alan Cobham and Mr. O. P. Jones with their 10,000 or so joy-ride passengers apiece in England and Scotland did far more for the real good of aviation than they have done since they quit provincial touring and took to Continental navigation and to regular air-line work.

The air-taxi and joy-ride firms are the people who are doing for England in the air the work which before the War 1914-18 our trawlers and tramps did at sea as compared with that of the subsidised floating hotels and the ships of the Royal Navy. We know only too well how in spite of the failure of the British Navy the despised civilian seamen held our sea communications. We may be certain that the R.A.F. will not let us down in the same way in the next war as the Navy let us down in the last. But it is well to recognise the value of the work which has been and is being done by our unsubsidised civilian aviators.

Officially and commercially we have made a pretty fair average mess of our civil aviation, but for some strange reason God loves England and our worst mistakes turn ultimately to our advantage. The outstanding fact remains that so far as civil aeroplanes and pilots and mechanics are concerned no country in the World can touch us.

Our aeroplanes and engines may not be commercial but they certainly are the best built and best maintained in the World. Our aerodromes are the best managed. No other country is in the same street with us for wireless apparatus and other adjuncts to flying—far as we are behind where we ought to be. And our pilots have proved over and over again that they will get through when no others will do so.

Whatever may be one's opinion of subsidies or the commercial management or mismanagement of the lines themselves one takes off one's hat to the air and ground personnel of the air lines and of our minor civil aviation concerns. They at any rate are upholding the best traditions of those who won for us the command of the sea in the days when the sea was as important to us as is the air to-day.—C. G. G.

THE ROYAL ENGAGEMENT.

The following announcement appeared in the Court Circular on January 15th:—

"It is with the greatest pleasure that The King and Queen announce the betrothal of Their beloved son the Duke of York to the Lady Elizabeth Bowes-Lyon, daughter of the Earl and Countess of Strathmore and Kinghorne, to which union The King has gladly given His Consent."

His Royal Highness is a Group Captain in the R.A.F. and all ranks of the R.A.F. will tender to him their respectful congratulations on this auspicious occasion.

THE NEW WORLD'S SPEED RECORD.

The record set up by Brig.-Gen. W. Mitchell, Assistant Chief of the U.S. Air Service on October 18th has just been homologated by the F.A.I.

He flew the Curtiss Army Racer (460 h.p. Curtiss D.12 engine) which Lieut. Maitland flew in the Pulitzer Trophy and over an electrically-timed course at Selfridge Field made four laps at the following speeds. Down wind, 243.94 and 241.83 m.p.h., and up wind, 204.29 and 206.15 m.p.h., making an average of 224.05 m.p.h. (361.28 km.p.h.).

The following records made during the Pulitzer Trophy by Lieut. Maughan, the winner, have also been homologated: 100 kms.: 206.3 m.p.h. and 200 kms.: 205.9 m.p.h.

The passing of the speed records from France to the United States is a striking example of America's rapid progress. It is due entirely to the whole-hearted support given to the Industry by the U.S. Army and Navy Air Services, and is primarily due to General Mitchell himself.

Now that the World's Speed Record stands officially at 224 m.p.h. it is to be hoped that it will be accepted as such by France, as since Gen. Mitchell's flight much doubt has been thrown on it.

In the issue of "L'Aero-Sports" for January 13th it is stated that M. Sadi Lecointe had departed for Istres to try to bring back to France the speed record "which—without a very rigorous control—the Americans have allocated to themselves."

It might be mentioned that the American record was electrically timed whereas the French records have from the day they were first taken been entirely in the hands of observers with stop-watches, always an unreliable method of timing.

L. B.

SUPERMARINE RECORDS.

The performances of Capt. Biard in the Supermarine Flying Boat (Napier "Lion" engine) in the Schnieder Trophy Competition at Naples, have been officially declared to be World's records for Speed for 100 kilometres (62 miles), 200 kilometres, Duration and Distance.

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R.A.F. INTELLIGENCE.

Appointments.

Air Ministry, Jan. 10th.

General Duties Branch.—Group/Capt. L. F. Blandy, D.S.O. (R.E.), to Air Ministry (Dept. of C.A.S.); on appointment to Temporary Commission in R.A.F. as Group Captain, on being seconded from the Army for three years; 30/11.

Wing/Cmdr. E. L. Gossage, D.S.O., M.C., from School of Army Co-operation to R.A.F. Depot (Supernumerary), 21/1.

S/Ldr. J. C. Quinnell, D.F.C., from School of Naval Co-operation and Aerial Navigation to R.A.F. Base, Gosport (Supernumerary), 15/1.

F/Lts. J. C. Slessor, M.C., from No. 20 Squadron (India) to R.A.F. Depot (Supernumerary), 2/12; H. Cooch, from Air Ministry (Dept. of A.M.S.R.) to Royal Aircraft Establishment, 1/1; A. C. Sanderson, D.F.C., from No. 100 Squadron to No. 2 F.T.S., for duty as Adjutant, 15/12; W. H. L. O'Neill, M.C., from No. 2 F.T.S. to No. 100 Squadron, 8/12 (substituted for the notification which appeared in R.A.F. Bulletin dated 12/12); T. Q. Stuld, D.F.C., from School of Naval Co-operation and Aerial Navigation to No. 2 F.T.S., 15/1.

Medical Branch.—S/Ldr. J. Rothwell, M.B., from R.A.F. Depot to School of T.T. (Men), 15/1; the notifications wherein this officer was posted to R.A.F. Hospital, Cranwell, and to School of T.T. (Men), respectively, are hereby cancelled.

F/Lts. F. J. Murphy, M.B., from No. 1 Squadron (Iraq Command) to H.Q., R.A.F., Middle East, 6/11, and to E.R.D. (M.E.), 4/12; T. J. X. Canton, M.B., from No. 55 Squadron (Iraq Command) to H.Q., R.A.F., Middle East, 6/11, and to No. 216 Squadron (M.E.), 4/12; J. A. Perdrau, M.D., from School of T.T. (Men) to R.A.F. Depot, 18/1.

Stores List.—F/Lts. P. J. Murphy, from Stores Depot, Egypt, to Aircraft Park, Constantinople Wing, 25/9 (substituted for the notification wherein this officer was posted to No. 208 Squadron, 26/9); L. Smith, from No. 25 Squadron (Constantinople Wing) to R.A.F. Depot (Supernumerary), 20/12.

From *The London Gazette*, Jan. 9th.

General Duties Branch.—F/O. F. R. Wynne is granted a permanent commission in rank stated (Dec. 12th, 1919) (since promoted); the notification in *Gazette* of Dec. 12th, 1919, appointing him to a short service service commission is cancelled.

Wing/Cmdr. C. E. Risk, D.S.O., is placed on retired list, 7/12

Air Ministry, Jan. 15th.

General Duties Branch.—Wing/Cmdr. C. T. Maclean, D.S.O., M.C., from H.Q., R.A.F., India, to Half-pay List, 19/1.

S/Ldrs. V. Gaskell-Blackburn, D.S.C., A.F.C., from No. 55 Squadron (Iraq Command) to R.A.F. Trans-Jordania, H.Q., Palestine Command, for duty as Station Commandant, 9/12; N. H. Bottomley, A.F.C., from H.Q., R.A.F., Middle East, to No. 4 F.T.S. (M.E.), 19/12; D. G. Donald, D.F.C., A.F.C., from R.A.F. Base, Gosport (No. 3 Squadron), to Air Ministry (Dept. of C.A.S.) (D.T. & S.D.), 22/1.

F/Lts. H. C. Todd, from R.A.F. Depot to No. 2 Squadron, 15/1; T. O. Clogstoun, from R.A.F. Depot to No. 100 Squadron, for duty as Adjutant, 12/1; L. M. Iles, A.F.C., from No. 5 F.T.S. to No. 7 Group H.Q., 10/1; D. Craik, D.F.C., from R.A.F. Depot to No. 1 Group H.Q., 12/1; T. J. West, M.C., from No. 1 School of T.T. (Boys) (Halton) to Aeroplane Exper. Estab. (Supernumerary), 1/2; A. P. Ledger, M.B.E., from No. 4 F.T.S. (M.E.) to R.A.F. Depot (Supernumerary), 16/12; H. E. F. Wyncoll, O.B.E., M.C., from H.Q., R.A.F., India, to No. 70 Squadron (Iraq Command), 1/12; L. A. K. Butt, from No. 4 F.T.S. (M.E.) to C. & M. Party, Moascar, 26/9, and from C. & M. Party, Moascar, to No. 1 Armoured Car Company (Palestine Command), for duty as Adjutant, 11/12; C. F. Horsley, M.C., from H.Q. Iraq Command, to Basrah Group H.Q., 5/12.

Medical Branch.—S/Ldrs. H. A. Hewat, M.B., from R.A.F. Depot to Central Medical Board, 16/1; A. E. Panter, B.A., from H.Q., Iraq Command, to Baghdad Combined Hospital, 5/11; D. Power, M.C., from No. 1 Squadron (Iraq Command) to Baghdad Combined Hospital, 6/11; R. E. Bell, M.B., from H.Q., Iraq Command, to Station Commandant (Iraq Command), 6/11.

F/Lts. P. A. Hall, M.B., B.A., from No. 45 Squadron to Station Commandant (Iraq Command), 2/12; P. C. Livingston, D.P.H., from R.A.F. Depot to R.A.F. Central Hospital, 8/1; P. J. Flood, from H.Q., Iraq Command, to Baghdad Combined Hospital, 5/11; H. B. Troup, from H.Q., Iraq Command, to Baghdad Combined Hospital, 5/11; A. Briscoe, M.B., from No. 55 Squadron to Basrah Combined Hospital, 3/12; A. C. Ransford, from H.Q., Iraq Command, to Station Commandant (Iraq Command), 5/11; D. Le Bas, from H.Q., Iraq Command, to Baghdad Combined Hospital, 5/11; J. C. T. Fiddes, M.B., from Aircraft Depot (Iraq Command) to Station Commandant (Iraq Command), 16/11; J. B. Woodrow, from H.Q., Iraq Command, to Baghdad Combined Hospital, 5/11; J. M. A. Costello, M.C., M.B., M.Sc., from H.Q., Iraq Command, to Basrah Combined Hospital, 12/11; W. D. Miller, M.B., from H.Q., Iraq Command, to Station Commandant (Iraq Command), 5/11; J. G. F. Heal, M.D., from Research Laboratory and M.O.S.I. to R.A.F. Hospital, Cranwell, 10/1; E. F. N. Currey, from Research Laboratory and M.O.S.I. to R.A.F. Depot, 10/1.

Accountants.—S/Ldr. H. J. Down, from H.Q., Constantinople Wing, to H.Q., C.A. (Supernumerary), for duty at Air Ministry as Inspector of Accounts, 19/12.

From *The London Gazette*, Jan. 12th.

R.A.F. General Duties Branch.—Lt. R. H. Portal, D.S.C., R.N., is granted a temp. commn. as a F/Lt. on attachment for three years' duty with R.A.F., Jan. 8th. Wing-Cmdr. F. E. T. Hewlett, D.S.O., O.B.E., is restored to full pay from half-pay, Jan. 10th.

Stores Branch.—F/Lt. R. D. Ward-James is removed from R.A.F. on conviction by Civil Power, Nov. 17th.

[N.B.—Ward-James was the Accounts Officer who absconded to Canada from Gosport.—Ed.]

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports' Board.)

Rugby Football.—R.A.F. v. Guy's Hospital.—Played at Honor Oak Park on January 10th. The Service team though well represented forward was weak outside, and Guys' who were practically at full strength won the game through their clever outside play.

Guys' kicked off with a strong breeze behind them and immediately pressed. They cleverly kept the play in the Air Force 25 with the result that after ten minutes' play Taylor forced himself over for a try. Some very pretty play by Guys' centres resulted in a try by Albertijn. Shortly after a third try was scored and the teams changed ends with the score 13—0 in Guys' favour. With the wind now behind them the Service pressed, but the movements lacked finish and the outsides were prone to drop their passes.

[One's personal opinion is that owing to the weakness of the centres they seldom got any passes to drop.—Ed.]

Nevertheless the Air Force thanks to their forwards and a very fine display by Russell at half, had more than their share of the game, and the pressure was kept up to within 5 minutes of time when Guys' scored twice in quick succession. The first kick was successful and Guys' run out winners by 21 points to 0.

The Air Force forwards played a very fine game against the well-trained Guys' pack and when they get more together they should do great things. S/Ldr. Russell played a great game at scrum half.

R.A.F.—L/AC. Runham, back; L/AC. Snaith, P/O. Heat, F/Lt. Neale and F/Lt. Riddle, three-quarter backs; F/O. Baker and S/Ldr. Russell, half-backs; F/Lt. Wakefield, F/Lt. Usher, F/Lt. Simpson, S/Ldr. Stephens, F/O. Adams, F/O. Vernon-Harcourt, F/O. Chick and P/O. Coventry, forwards.

The inter-Services matches will take place as follows:—Wednesday February 14th R.A.F. v. R.N. at Twickenham (14.45 hrs.). Saturday March 10th R.A.F. v. Army at Aldershot (15.00 hrs.).

Tickets for the Navy and Air Force match may be obtained from Alfred Hays, 26, Old Bond Street, W., price 4s. 5s. and 6s. (including admission and tax if purchased before the day). Admission to the ground 1s. 6d., sailors, soldiers and airmen in uniform 9d. Arrangements for the sale of tickets for the Army and Air Force match are not yet completed.

The inter-Services Rugby dance will be held on the night of the Navy and Army match, at the Hyde Park Hotel (9.30 to 2.30). Applications for tickets (22s. 6d. each including wines) should, in the case of officers of the Air Force, be made to the Secretary, R.A.F. Sports Board, Air Ministry, Kingsway, W.2.

THE RETURN OF M. COPPENS.

The *Morning Post* states that Lieut.-Aviateur Chevalier Willy Coppens, Air Attaché to the Belgian Embassy, who has been on a special mission to Baghdad, returned to London on January 11th.

JAPANESE NAVAL AVIATION.

In accordance with the Washington Disarmament Regulations, Japan is cancelling the construction of the battle cruisers *Anagi* and *Akadi* and these will be converted into aircraft carriers of 20,000 tons displacement. They will have accommodation for 50 aircraft each and will be commissioned in 1924 together with the *Hosho* of 9,000 tons displacement, which has been built on the lines of H.M.S. *Argus* and will have accommodation for 20 aircraft.

The aeronautical programme, the realisation of which will be completed in 1925, calls for the creation of 5 aircraft sections at Yokosuka, 3 at Sasebo, 2 at Omura and 7 at Kasumigaura. It also includes the carrying of 200 aircraft in warships.

THE SWEDISH AERO SHOW.

As already announced in The Aeroplane the City of Gothenburg is holding a Jubilee Exhibition this year and in connection with it is an International Aero Exhibition which will be held from July 20th to August 12th. The great feature of this Aero Exhibition will be a series of international flying tests for aeroplanes and seaplanes to be held at Torslande, the aerodrome of Gothenburg, from August 4th-12th. It is understood that the aerodrome is bounded on one side by a large sheet of water available for seaplanes.

Whether in the present bad state of trade it will be possible for any British aircraft firms to afford the cost of sending exhibits to Gothenburg is very much a matter of doubt unless the Society of British Aircraft Constructors arranges a co-operative exhibit, but it is certainly very much to be hoped that a few British aeroplanes and seaplanes will be sent to compete in the flying competitions. There will certainly be quite considerable business to be done in aircraft with all the Baltic States sooner or later.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

In a leading article attention is drawn to the lack of any universally accepted system of aerodynamical units and symbols, and to certain divergencies, both in results and in the methods of exhibiting those results, which exist as between the aerodynamical authorities of various nations.

These differences are obstacles of a purely artificial nature to international exchange of knowledge and it seems eminently desirable that some effort should be made to remove them.

A very interesting Fokker amphibian fitted with a Napier "Lion" engine is described and illustrated in this issue.

A new German test book on aerodynamics, which gives a compact outline of the modern theories developed in Germany in the past few years, is reviewed in this issue.

INTERNATIONAL CO-OPERATION IN AERONAUTICAL RESEARCH

The review of a German text-book on aerodynamics which appears on a later page draws attention to a subject which is of very considerable importance to the progress of knowledge in aeronautics. At the present moment there are aerodynamical laboratories of one sort or another in practically all civilised lands, and in those laboratories earnest seekers after knowledge are attempting to lay the foundations of an orderly knowledge of aerodynamics.

Obviously unless all who are actively concerned with the science of aeronautics are fully informed of the results achieved by other workers in the same field there is likely to be a considerable waste of effort, and a correspondingly slower progress along the desired path. In the present state of civilisation difficulties due to the difference of language as between various nations represent relatively little hindrance to the free exchange of ideas. Other and more artificial difficulties are in fact a much greater obstacle to the spread of knowledge than any difference of tongue.

These difficulties had their origin before the War, but the War has very considerably aggravated them.

Artificial Obstacles to Mutual Understanding.

Among these obstacles are the absence of any internationally accepted system of units for aeronautical measurements, the lack of agreement as to a standard method of exhibiting the results of tests, and the serious discrepancies in the experimental results obtained by laboratories in different parts of the world.

These three difficulties are of importance to the practical engineer as well as to the scientist or research worker. A strange system of units is at best a nuisance, and at worst it may lead to serious errors. A polar diagram exhibiting the qualities of a particular wing section may convey nothing to one who is accustomed to the type of curve common in this country, and if he wishes to interpret it he must convert it to a more familiar form. And as he probably knows that the different wind channels of the world often disagree violently in their measurements on similar bodies he will very probably not trouble to convert it at all—simply because the results being of a different origin there is no certainty that they are accurately comparable.

Aerodynamical Units.

The standardisation of aerodynamical units presents no insuperable difficulty. Three systems of units are in use by the main aerodynamical laboratories of the world. The kilogramme-metre-second system introduced in France by M. Eiffel and standard in all Latin countries—the so-called "absolute" non-dimensional system adopted by the N.P.L.—and the German non-dimensional system. These three are connected by very simple numerical relations and any one of them would form a satisfactory working system.

The German system is possibly the most logical and the most convenient for scientific work, the British is little inferior, and would probably be more easily acceptable in certain quarters than would the German.

These seem to be very good reasons for standardising the polar diagram as the method of expressing wing characteristics in a graphical form. This form of curve lends itself more directly to the construction of curves exhibiting the characteristics of a complete aeroplane than does the form more usual in Britain—but more important still is the fact that it is standard in every country except Britain and the United States—and it is very probable that it will shortly be adopted as a standard in the latter country.

Divergences between Wind Tunnels.

The discrepancies between the results obtained by different wind tunnels are not so easily to be overcome. The N.P.L. some time ago arranged to construct a series of models, and to send these models on a tour of various aerodyamical laboratories, in order to obtain some evidence as to the extent of the concordance or otherwise between various wind tunnels. It is understood that the models are now on their travels, but unfortunately owing to political considerations all ex-enemy laboratories have been excluded from the programme.

[Which is obviously mere silly pandering to French prejudice.—Ed.]

Also it would appear that certain of the authorities to which the models have been or are to be forwarded consider that the N.P.L. have devised the tests which it desires to be carried out without proper consultation with themselves, and there appears to be some risk that the tests will be even more restricted than was originally intended.

Even so incomplete a series of tests will have a certain value and may help to clear up some of the present uncertainties, but very obviously the full advantage of any such an attempt to discover the real extent of divergence between the world's aerodynamical laboratories, and to account for and if possible remove the errors can only be gained if all the important laboratories—including those of Germany—take part in the tests in the right spirit.

The Need for Co-operation.

This object could only be obtained as the result of co-operation between all the parties concerned. A very strong plea in favour of arranging for an interchange of views in order to arrive at an agreement both upon the standardisation of units and of symbols, and as to a programme of tests intended to clear up the question of the apparent differences between experimental results obtained at different laboratories has recently been made in America, by Mr. W. J. Knight. A series of articles on the subject of standardisation in aerodynamics written by Mr. Knight have appeared in *Aerial Age* of New York.

From these articles it appears that in general the aerodynamists of all countries are agreed in principle as to the desirability of such action. The main obstacle to any really international attempts to reach an agreement as to such action are of a political nature. The more important aerodynamical laboratories of the world are Government institutions. Certain Allied Governments would very certainly refuse to be represented even at a purely techincal conference of this nature which was attended by German representatives. Under present conditions the American Government refuses to be officially represented at any international conference whatever—and such a conference unattended by a representative of the American Advisory Committee for Aeronautics would be of limited practical value. It seems that if once the Allies generally can be persuaded to admit German representatives to an international aerodynamic conference the difficulty as to American representation might be overcome.

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It is certainly ridiculous to attempt to ignore Germany in this respect. In so far as the science of aerodynamics is concerned Germany at the moment certainly leads the world and to attempt to boycott her representatives in such matters is merely to refuse to take full advantage of the advance in knowledge due to German effort.

It is probably useless to expect any action to the desired end to originate from France. Since the change in Government in Italy, that country can scarcely act.

Britain could and should take the initiative in this matter. The subject would need to be approached with considerable circumspection in order to avoid to the utmost extent the inevitable political outcry which would arise in certain quarters.

Fairly certainly some of our late allies would refuse to be represented at any conference which resulted. Equally certainly Germany and all the neutral States of any importance would accept, and if the difficulty of American representation could be overcome—as for instance by calling the American delegate an "observer"—the resulting agreement, if one were reached, would be of very much greater practical value than any result of a conference from which Germany was excluded.

Practical difficulties of a very serious nature stand in the way of the success of such a conference. It would be too much to expect the German representatives to refrain from laying stress on the hardships imposed on them by the clauses of the Treaty of Versailles which regulate Germany's aerial activities. On the other hand, however much their fellow delegates from other lands might sympathise with the hard lot of their German fellow workers it would be entirely improper, and probably disastrous, for a congress of this nature to allow itself to discuss such political questions as are involved in this matter.

Britain, America, and Germany of all the nations who were involved in the late War have the characteristics most likely to lead to an orderly discussion of the essentials of this question. And an agreement on the matters discussed above by those three nations would in time certainly be accepted by every aerodynamical scientist throughout the civilised world.—W. H. S.

THE FOKKER AMPHIBIAN.

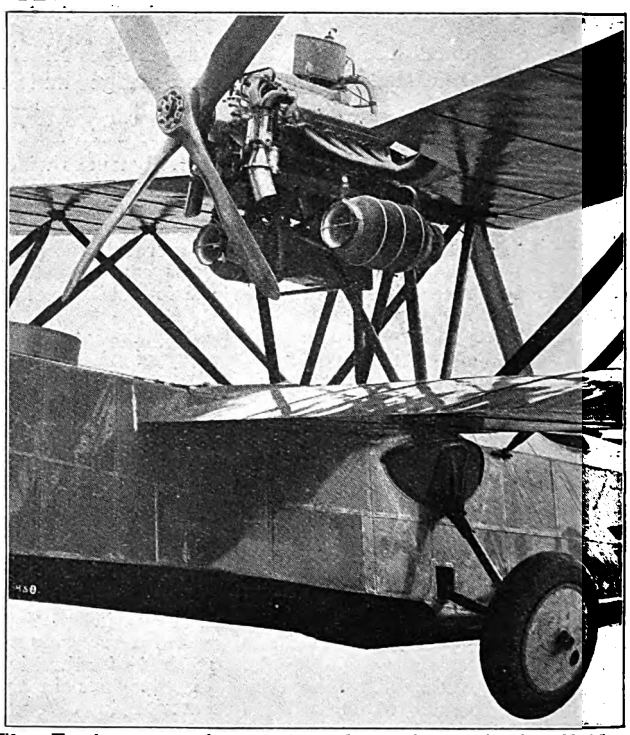
The very interesting machine which is shown in the accompanying illustration has recently been produced by the "Nederlandsche Vliegtuigen Fabriek" of Amsterdam for the service—it is believed—of the Dutch Navy.

The hull is entirely constructed of duralumin, and is built up on a very stiff keel girder which extends throughout at practically the full depth of the hull. The form of the hull, with its two steps very obviously follows British experience in design, and in fact very closely resembles the hull of the Vickers Vikings in lines.

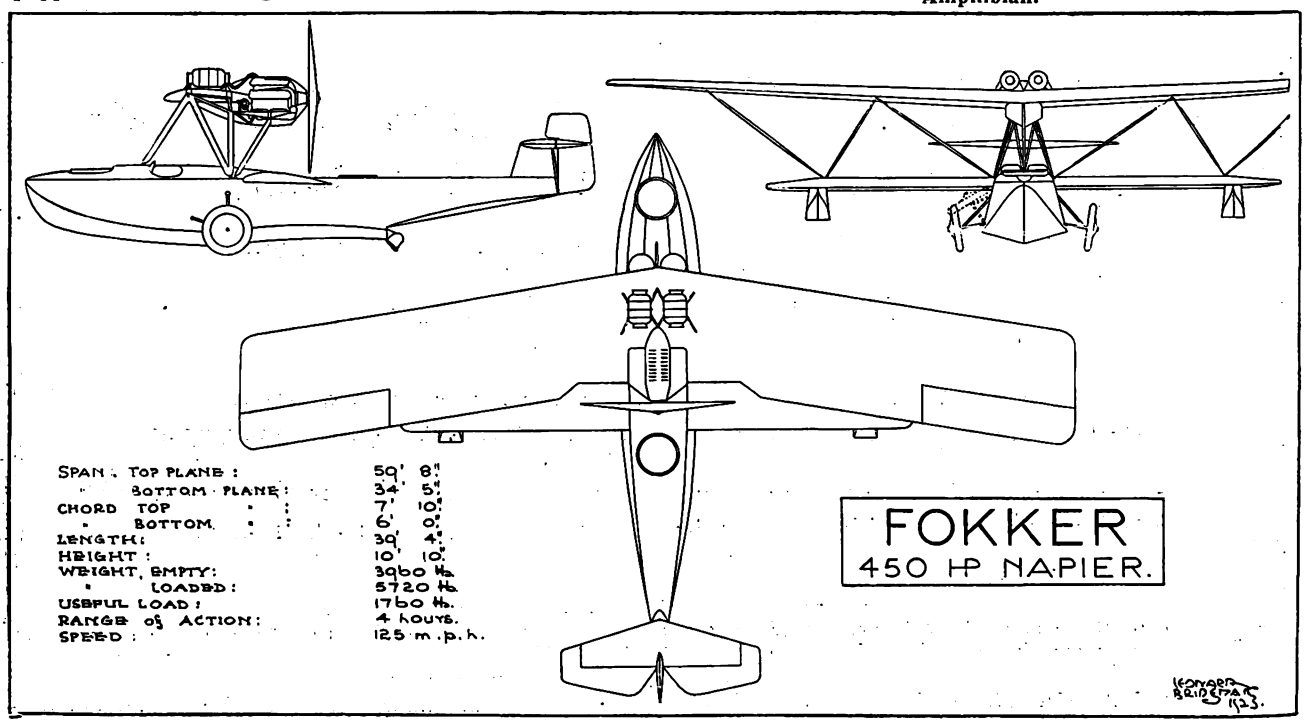
The wings are of wooden construction, plywood covered, and are rigidly braced by a series of N struts which form a "Warren" bracing. The upper wing is of greater span and chord than the lower, it has a marked dihedral angle and a distinct backward rake from roots to the tips. The lower wing has neither dihedral nor backsweep, and is staggered back at the roots to such an extent that at the lower wing tips the trailing edges of the two wings are vertically one above the other. Ailerons are fitted to the upper wing only. The tail unit consists of a large tail plane carried well above the hull on a vertical fin, divided balanced elevators, and a large balanced rudder. The tail plane is hinged at its rear spar, and a tail incidence adjusting gear fitted inside the vertical fin allows for trimming the machine for varying loads and speeds.

The engine—a Napier "Lion"—is carried by four special struts from the bottom wing root spars. The engine mounting proper forms a complete unit to which are attached the Lamblin radiators, oil and water header tanks, and this unit as a whole may be detached by undoing four bolts, lifted out by a crane and stood on the four feet with which it is fitted.

The machine—as equipped for naval service—carries a gunner observer in the bows of the boat. This front seat is equipped with a control gear. Aft of this and ahead of the



The Engine mounting and undercarriage of the Fokker Amphibian.



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International Aero Exhibition

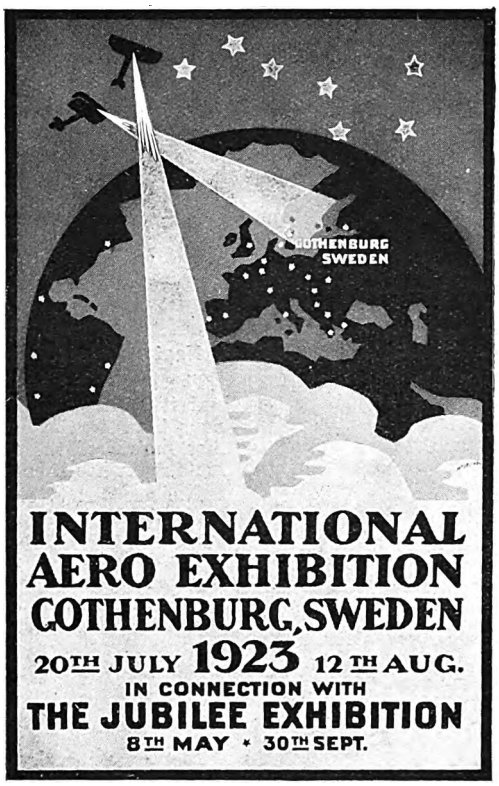
to be held at

Gothenburg, Sweden, 1923,

in connection with the

JUBILEE EXHIBITION

Ilug,
Gothenburg,
Sweden,
July 20th-
Aug 12th
1923



Ilug,
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During the Aero Exhibition

Great International Flying Contests

for Aeroplanes and Flying Boats

will be held at Torslanda, the Aerodrome of Gothenburg

4th—12th AUGUST, 1923.

For all information apply to the Secretary, Aero Exhibition,
Postal and Telegraphic Address: ILUG, GOTHENBURG, SWEDEN,

Or to the British Committee of the International Aero Exhibition at Gothenburg, 1923, c/o Admiral Mark Kerr, 16, Cumberland Terrace, Regent's Park, London, N.W.1.

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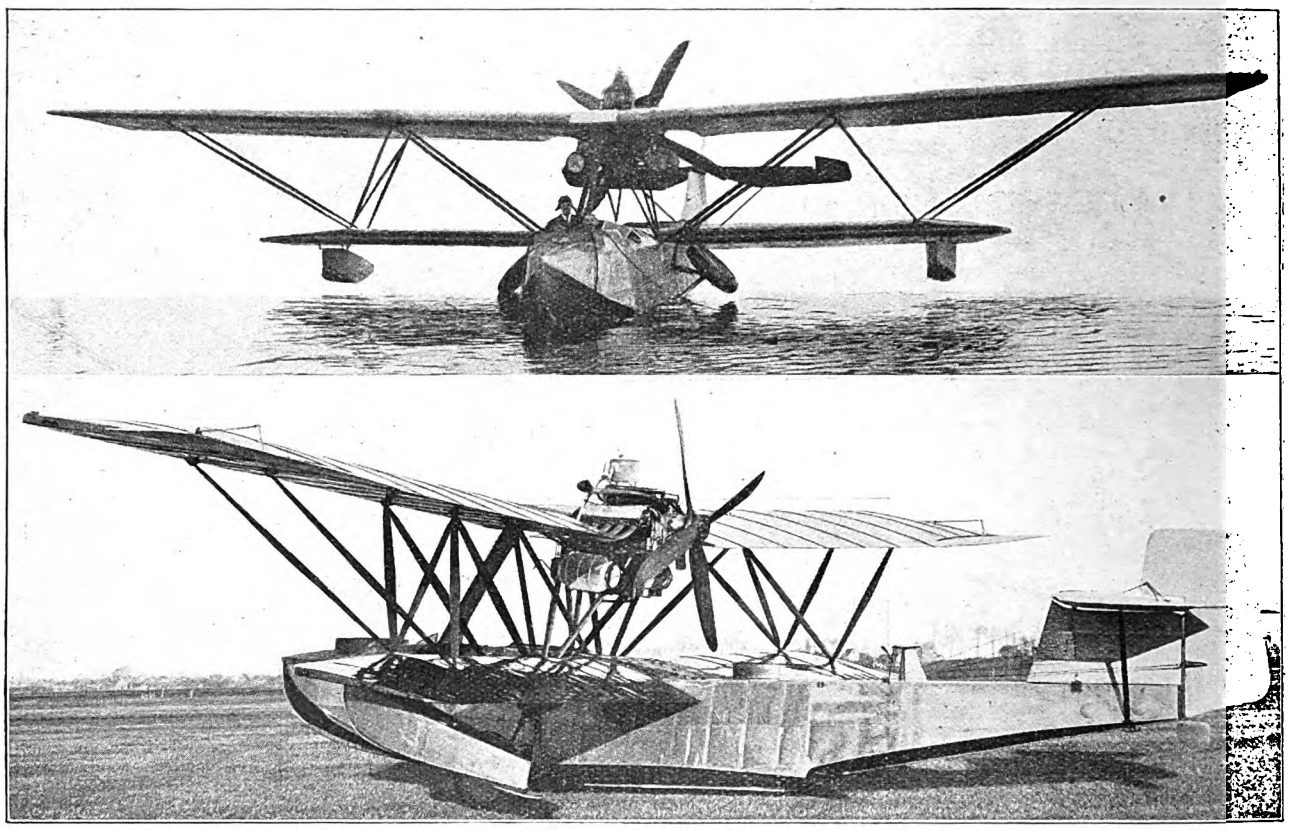

The Fokker Amphibian (450-h.p. Napier) afloat and ashore.

leading edge of the wings are two side-by-side seats—one for pilot and one for a mechanic. Behind the wings again is an after gunner's cockpit.

Four fuel tanks—of a total capacity of 600 litres (120 gallons)—are carried in the hull ahead of the after cockpit, with pump feed to a service tank in the top plane.

The wheeled undercarriage hinges about the end of an axle which passes into the hull, in such a manner that the wheels fold up below the lower wing—somewhat as in the case of the Supermarine amphibian built for the Air Ministry Competition of 1920.

The general appearance of the machine is well shown in the photographs reproduced, and the main dimensions, etc., are given on the outline general arrangement drawing. It should be noted that the drawing represents a machine which differs in some details from that shown by the photographs—notably in the arrangement of the radiators—and that it is not known whether the drawing represents the original design which has been modified, or whether it represents the result of experience with the experimental machine of the photographs.

A TREATISE ON MODERN AERODYNAMICS

[Handbuch der Flugzeugkunde, Band II., "Aerodynamik." By Fuchs and Hopf. Published by Richard Carl Schmidt and Co., Berlin, 1922.]

It is convenient to find in this one volume a concise and yet fairly complete account of the aerodynamical foundation of the theory of flight, based on the Prandtl-Lanchester method.

In the introduction are summarised the problems to be considered the quantities to be measured and the methods used. The definition of density (of air only) as mass ÷ volume × gravitation will please a certain school in this country.

The book is divided into two parts, Part I. dealing with aerodynamics and Part II. dealing with aeroplane motion.

Part I. chapter 1 summarises the fundamental theorems of rational hydrodynamics in three dimensions with the solution of the problem of a sphere as illustration, chapter 2 in two dimensions with solution for a circular cylinder. The Kutta-Jukowski transformation from a circular cylinder to the now well-known Jukowski profiles, is then dealt with at considerable length, and a number of important results are brought together in a logical manner.

In the third chapter the transition is made from the two-dimensional problem of the wing with infinite aspect ration to the three-dimensional one of the wing with finite aspect ratio in the manner first elucidated by Lanchester, by taking account of the velocities induced by the eddies streaming back from the wing and largely concentrated near the wing tips.

The statement and treatment are of necessity mathematical and it is indeed the introduction of the mathematical relations between the vortex strength and the induced velocities that makes of the theory a working routine for the design room, as it has become in Germany.

The account is elementary from the point of view of the professional mathematician, but it is unfortunately beyond the scope of the average technical engineer in this country. Induced resistance is defined and Munk's striking theorem is given—that for least induced resistance the distribution of vortex strength and therefore of lift along the span is proportional to the ordinates of an ellipse. The rest of the chapter contains numerical applications to monoplane wings. Chapter IV. extends these results to multiplanes, and reduces a whole range of problems in mutual interference to applications of the same general principles in a very striking and beautiful way.

Chapter V. deals with more recondite physical problems, covering Helmholtz's sheets of discontinuity, Karman's range of stable eddies and Prandtl's boundary layer. These problems may be commended to the professional hydrodynamicians of this country as worthy of more notice than they have hitherto received.

Chapter VI. is devoted to comparisons with measured values and offers convincing proof of the soundness of this revolutionary progress in aerodynamics, regarded as a physical problem, and not as an exercise in analysis. It must by no means be supposed that the whole subject is reduced to logical mathematical deductions from a few principles as in rigid dynamics. There are still many gaps to be filled at present only by experimental measurements. But the Lanchester-Prandtl theory gives a marked unity to a whole range of problems which were previously in appearance quite unrelated, and this constitutes its great value.

Chapter VII. on airscrews occupies exactly ten pages, and its value is scarcely even in this modest proportion. Schaffran's tests on water screws are given in a typical efficiency curve.

The second part deals with more familiar matter in discussing aeroplane motion and stability.

Chapter I. covers the usual ground in discussing the relations between speed, lift, drag, power, thrust, torque, climb, load, etc., at different incidence, density, and height.

The relations between power-plant weight, glider weight, and disposable load are treated in a manner much inferior to the method given by Sée. (Les Lois Expérimental de l'Aviation.)

Chapter II. deals with equilibrium in flight along familiar lines but with applications well worth study, Fig. 228 illustrating a most instructive case.

Chapter III. deals with longitudinal disturbances, Chapter

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LONDON to CALCUTTA in an A.D.C. D.H.9.

Capt. Norman MacMillan, M.C., A.F.C.

Capt. MacMillan arriving at Karachi.

Messrs. AIRCRAFT DISPOSAL CO., LTD.,
London.

Gentlemen.

Several things may interest you in connection with the flight from London to Calcutta in which I piloted a 240 h.p. SIDDELEY PUMA—D.H. 9 supplied by A.D.C.

We made a non-stop aeroplane flight across the eastern Mediterranean from Athens to Egypt (Sollum), a distance of 485 miles, in 4 hours 30 mins. Not once during this sea crossing did the engine give a moment's cause for anxiety.

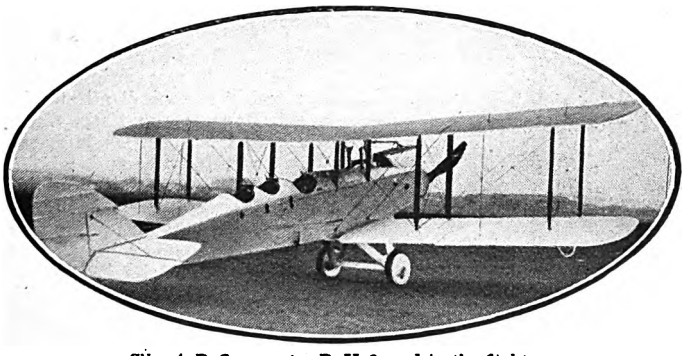
We made the first flight across India during the monsoon—through tropical storms and with temperatures ranging up to 123° F. in the shade. Mountain flying and desert flying we had in plenty, bad going in the air and on the ground.

The load carried was far in excess of the war load for which the machine was designed and the strains imposed upon her were vastly greater than would have been the case with normal load.

It is not possible to say we had no trouble—I feel certain that any present day machine would have given trouble under the conditions we encountered—but I think that its performance in carrying us to Calcutta speaks eloquently for the condition of the machines which you supply.

Yours faithfully,

NORMAN MACMILLAN (signed).



The A.D.C. 3 seater D.H.9 used in the flight.

AIRCRAFT DISPOSAL COMPANY, LIMITED,

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III. with lateral. There is much interesting detail in the reduction of special cases and many graphical solutions are given. On p. 348 is found a travesty of Bryan's views, but on p. 350 a very fair acknowledgement of his work is given.

At the end of the book extensive references to German and foreign authors are given in systematic tabular form.

The volume is excellently printed, on paper of almost pre-war quality, and the diagrams are clear and well reproduced. The arrangement of the matter and of the index is in accordance with the best German traditions of order and painstaking thoroughness.—A. R. L.

WHO'S WHO IN ENGINEERING.

["Who's Who in Engineering." Edited by J. E. Sears, Jnr., C.B.E., M.A., M.I.Mech.E., etc. Third Edition 1923. London, The Compendium Publishing Co., 93 and 94, Chancery Lane, W.C.2. Price 28s. net.]

The third edition of this work represents a distinct advance—in regard to completeness—over the previous issue. The obvious value of a directory of this type to all interested in engineering has naturally moved more and more of the individuals concerned to overcome their natural modesty and to provide the editor with the necessary particulars as to their own activities, with the result that the present volume is nearly one-half as large again as was the previous edition.

In regard to aeronautical engineers the volume contains very full information, and there can be very few members of this profession who occupy positions of any responsibility whose names are not included.

In addition to personal notices, the book contains a very complete guide to the various engineering and technical societies, and their programmes for the year 1923, together with a good deal of useful legal and commercial data, and a very complete guide to engineering manufacturers. There is evidence of very great care in the compilation of the work and in the reading of the proofs—literal errors of the type which are so difficult to avoid in a work of this kind are conspicuously rare—and the editor must be congratulated upon the production of a work of reference of the very highest value.

A HANDLEY PAGE FOR THE U.S.A.

Handley Page Ltd. have at present under construction at their works at Cricklewood an extremely interesting machine which is destined for the United States Naval Air Force. The machine is a small single-seat fighter for ship-board use, and is to be equipped with interchangeable wheel or float undercarriages.

It is a cantilever monoplane, fitted with Handley Page slotted wings and with a monocoque body. The wing loading is to be extraordinarily high, despite which fact a very low landing speed is expected, and with an engine of quite moderate power a very fine all round performance may be expected.

Exhaustive wind channel tests have been made in the firm's wind channel by Mr. Reynolds and part of these tests will shortly be published by the Aeronautical Research Committee.

It is however not yet permissible to publish any more specified details concerning this machine, but the design is a distinct advance and reflects credit on Mr. Richards who is in charge of design.

AN ENGINED GLIDE.

In connection with the forthcoming gliding meeting which is to be held at Biskra from January 25th to February 20th. Lieut. Thoret was sent on a Mission by the Under-Secretary of State for Aeronautics to select a suitable venue and to study the upward currents.

In that connection, the Algiers Air Station lent him an Hanriot biplane (80 h.p. Le Rhône engine) and with this he conducted some soaring experiments. At first he merely throttled his engine but on January 2nd he succeeded in flying for 14¼ minutes after which he made a voluntary landing, the whole of this flight being made with the engine stopped.

On January 3rd he left the ground at 9 a.m., used his engine to reach a height of 600 feet, then switching off he remained in the air for 7 hours 3 mins. He moved backwards and forwards along a hill face 1,500 metres long, using the movement of sand on the crest of the plains and also the smoke from a fire kept going by his mechanics to determine the direction of the various wind currents. In his last hour he had reached a height as great as that with which he started, but decided to land at 4 o'clock owing to fatigue and the fall in temperature caused by the setting of the sun.

It is not quite clear whether this performance should be called "Glying" or "Fliding." At any rate it seems to be a new species of Rhone Soaring.

The machine he used was a standard Hanriot training biplane, type H.14, which weighs 516 kilogs. light and 620 kilogs. with pilot and petrol which represents a wing loading of 18 kgs. per sq. metre (about 4 lbs. per sq. ft.).

AN ITALIAN FLYING BOAT RECORD.

The Italian pilot Passaleva testing a flying boat over Lake Maggiore attained a maximum speed of 277.992 km.p.h. (173.745 m.p.h.). This speed, which was timed and observed by Signori Marby and Massara, members of the Italian Aero Club, constitutes an Italian record, and doubtless it will be submitted for homologation by the F.A.I. as a World's Record.

THE MADON TAILLESS MACHINE.

On Dec. 26th, 1922, at Orly Capt. Madon made numerous flights on a tailless "Avion," presumably the "Simplex" biplane on which he has already flown. He astonished a commission of the Service Technique by the ease and precision of his manœuvres. On landing Capt. Madon declared himself enchanted with the machine.

GERMAN ENGINE DEVELOPMENTS.

During the war the B.M.W. engine made by the Bayerische Motoren Werke achieved a very high reputation and the various records put up by it, chiefly on Junkers monoplanes, since the war still further enhanced that reputation. It is therefore of interest to hear that the Bayerische Motoren Werke themselves have now ceased to build B.M.W. engines and under a new name are devoting their workshops to the construction of railway material. The B.M.W. engine itself is however still being built and the name also survives. The former Bayerische Flugzeug Werke, who made the well-known B.F.W. aeroplanes, have taken over rights of production of the B.M.W. engines and have also taken on the name of the Bayerische Motoren Werke. Also the Junkers Werke are now building the 185 h.p. B.M.W. engine under licence and have introduced certain modifications so as to bring the engine up to modern standards. This engine is now known as the Junkers Motor, type B.M.W.

The engine as now built however has not the supercompression of the original—as such "altitude" engines are not permitted by the Interallié.

It is also of interest to note that Ernst von Lössl, the designer of the "S.B.3" soaring monoplane has designed and is now running tests of a new "flat twin" aero-engine of 20 h.p. The special feature of this engine is that it is oil-cooled.

Yet another interesting piece of information is that Herr Hellmuth Hirth, who was so popular on the various occasions when he visited this country before the war and who was notable as not only one of the earliest but one of the most skilful pilots in Germany, is also in these days devoting himself to the production of aero-engines. The type with which he is experimenting at the moment is a two-cylinder two-stroke of very light weight with one ignition for two cylinders. The cylinders instead of being in the usual "V" form are vertical and parallel so that with the crankcase they form a "U." Further information about the Hirth engine is awaited with interest.

MR. NORTH'S ILLNESS.

Mr. J. D. North of Boulton and Paul Ltd., Norwich, intimates that he craves the indulgence of various people who have had no replies to letters addressed to him. He is at present in a nursing home and will not be able to attend to business for several weeks. All will regret very much to hear of Mr. North's illness and will wish him an early and complete recovery.

A CONSTRUCTIONAL NOTE.

Old timers in aviation will be interested to know that the Bernard "Ferbois" all-metal monoplane which created such a sensation at the Paris Show was designed by M. Hubert, brother of M. Charles Hubert who was one of the very early pilots at Hendon and who distinguished himself in the French Service d'Aviation during the War.

M. Hubert (senior) is himself a pioneer of French aviation and more especially a pioneer of metal aeroplane construction in that having been educated as an engineer he was for a long time at the R.E.P. works before the War and was employed on aeroplane design throughout the War. Thus it may be seen that the "Ferbois" is not in any way a freak machine. It is the result of long and steady research. Its actual performance in the air will be watched with considerable interest.

TO DRAUGHTSMEN AND DESIGNERS.

Any aircraft designers who are looking for work or for change of employment are invited to communicate by letter with the Editor of THE AEROPLANE. There are several very good jobs going for really first-class draughtsmen and designers and there are also vacancies for ordinary competent journeymen draughtsmen.

RELEASE OF A RECEIVER.

SUNBURY AVIATION CO., LTD. (in liquidation).—T. F. Wild, of Orient House, 42-5, New Broad Street, E.C., ceased to act as receiver or manager on July 4th, 1922.

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F-ADBM F-CMAK
F-ADBP F-CMAJ

C.M.A. Air Lines is the British title of the Compagnie des Messageries Aériennes, whose head office is at 2, Rue Galilee, Paris. The Company was originally founded early in 1919, by M. Louis Breguet, for the transport of goods from Paris to Lille, the ground communications having been so much disturbed by the European War. This line, which was the first commercial aviation service in the world, was soon extended to Brussels and the line from Paris to Brussels has been maintained by the Company ever since.

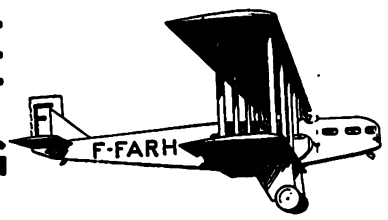
In September, 1919, a service between London and Paris was inaugurated in conjunction with Handley Page Transport, Ltd. This was originally operated three times a week each way, but later, when the two Companies separated, a daily service was commenced, which has now been extended to a thrice daily service.

By an arrangement with the Compagnie Générale Transatlantique a service is run to connect with the arrival and departure of this Company's sailings between Le Havre and New York. This is the first occasion on which a large shipping company has recognised the necessity of using commercial aviation in its transport policy.

The Company's service has now reduced the time of transit between London and Paris to two and a-half hours; between Paris and Le Touquet to one and a-quarter hours; between Paris and Brussels to two hours and a-quarter hours; between Brussels and Amsterdam to two hours and between Brussels and Cologne to run direct from London to Marseilles, calling at Paris and Lyons and connecting with the Steamship Lines to India and the East. This brings Marseilles within six and a-half hours' reach of London and Lyons within eight hours.

The C.M.A. Passenger Service is maintained by twin tractor Farman Goliath Biplanes, fitted with two 300-h.p. Renault Engines and with a seating capacity for 12 passengers, pilot and mechanic. This machine has a wing-span of 92 ft., a length of 49 ft. 6 in. and a height of 16 ft. Its cruising speed is 93 m.p.h. The freight, mail and newspaper services utilise the smaller type of single-engined Spad and Breguet.

The Compagnie des Messageries Aériennes is an association of Aerial Transport constructors for the study and application of aircraft Transport, and among its Board of Directors appear the well-known names of Messrs. Bleriot, Breguet, Caudron, Farman, Morane, Luquet de St. Germain and Renault.—*Extract from R.Ae.C. Year Book.*



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THE REVIEW OF THE YEAR (*Compiled by M. H. & G. D.*)

APRIL 1922

SERVICE AERONAUTICS.—On April 1st Air Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., was transferred from H.Q. (I.A.) to the R.A.F. Staff College as Commandant. Also on that date a number of R.A.F. officers with Navy, Army and purely Air Force experience were appointed to the Staff College as instructors.

On April 1st the Flowerdown Rugby Team defeated Cranwell in the final of the R.A.F. Rugby Cup by one goal (5 pts.) to one penalty goal (3 pts.). It was noteworthy that the Flowerdown team consisted of one Group Captain, one Squadron Leader, three Flight Lieutenants, one Flying Officer and nine Air Mechanics.

On April 4th the Royal Air Force Staff College at Andover, was officially opened, by Sir John Salmond.

CIVIL AVIATION.—In THE AEROPLANE of April 5th the first photographs of the D.H.34 (Napier "Lion" engine) were published and also of a Handley Page 0/400 fitted with two Bristol "Jupiter" engines. In the same issue Capt. Sayers discussed at considerable length the design of a commercial aeroplane.

The D.H.34s made their first trips to Paris this first week.

On April 7th a D.H.18 was being flown to Paris by Mr. Duke and a "Goliath" Farman was being flown from Paris by M. Mire. Owing to low clouds, both machines following the main route in the neighbourhood of Grandvilliers, they collided in the air. The accident resulted in the death of the pilot of each machine and five others.

In THE AEROPLANE of April 12th it was noted that the Duke of Sutherland had accepted the presidency of the Air League of the British Empire in succession to Major-General the Rt. Hon. J. E. B. Seeley, C.B., C.M.G., D.S.O.

The Imperial Airship Scheme submitted to the Air Ministry by Commander Burney, R.N., was described in THE AEROPLANE of April 12th and it was noted that the Air Ministry had announced that the scheme as modified by Commander Burney was still under consideration.

On April 13th Sir Ross Smith accompanied by his mechanic Mr. Bennett was testing the new Vickers "Viking" on which he was to have made the attempt to fly round the world. Unfortunately, owing to his lack of experience on this type of machine, he got into a spin from which he was unable to recover and crashed just outside the track, both men being killed instantaneously.

On April 13th Major S. T. L. Greer, who from the beginning of Civil Aviation has been senior C.A.T.O. first at Hounslow and then at Croydon relinquished his post to join the Instone Air Line. He was succeeded by Captain Stanley Baker.

On April 17th the Royal Aero Club held its first air race meeting of the year at Croydon. There was a large number of entries and a big crowd of spectators turned up. Three out of four races were won by Capt. Rex Stocken on a D.H.9a which had been specially speeded up by the Aircraft Disposal Company.

On April 19th the first of the new Handley Page W.8bs (Rolls-Royce "Eagle VIII" engines) arrived at Croydon piloted by Mr. Rogers.

AERONAUTICS OVERSEAS.—THE AEROPLANE of April 26 dealing with aviation in Canada showed how far ahead of other British Dominions aviation in Canada had progressed.

The South Atlantic Flight attempted by Captains Saccadura-Cabral and Gago-Coutinho was described in THE AEROPLANE of April 26th.

MAY 1922.

SERVICE AERONAUTICS.—In the May Air Force List it was reported that a number of additional units was to be formed in Iraq.

It was noted in THE AEROPLANE of May 3rd that the Air Ministry had announced that the prizes in the Air Ministry Competition for Safety Fuel Tanks for Aircraft had been awarded as follows: 1st Prize, £1,400; The India-Rubber Gutta Percha and Telegraph Works Co. Ltd.; 2nd Prize, £400. The Imber Anti-Fire Tanks Ltd.; 3rd Prize, £200: Commander F. L. M. Boothby. Descriptions of these tanks appear in THE AEROPLANE of May 10th.

On May 4th Mr. Baldwin Raper asked the Secretary of State for Air how many men were being employed at the Royal Aircraft Establishment on experimental work and how many on reconditioning machines and if it was not a fact that the reconditioning could be far better carried out by civil aviation firms. Capt. Guest's reply stated that 606 men were engaged on experimental work and that reconditioning was being done by the trade.

The death of Sir Walter Raleigh, who had just completed the first volume of "The History of the War in the Air," occurred on May 13th.

On May 26th Air Vice-Marshal J. F. A. Higgins, C.B., D.S.O., A.F.C., was appointed to H.Q. (I.A.) for duty as Air Officer commanding *vice* Air Vice-Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.

On May 17th the Committee appointed to inquire into the amalgamating of certain common services announced that a Technical Committee should be set up at once to make definite proposals for the amalgamation of the common services of the Navy, Army and Air Force such as intelligence, supply, transport, education, medical, chaplains and any other overlapping Departments. A separate Committee would investigate the practicability of a Ministry of Defence.

Replying to Sir W. Joynson-Hicks in Parliament Capt. Guest said that there were no fighting aeroplanes fitted with parachutes. A number of training aeroplanes were so fitted and instruction in the use of parachutes was being given but it was not intended to bring them into general use until they had reached a stage of development which warranted the expenditure.

On May 18th in reply to Mr. Baldwin Raper, Capt. Guest gave the figures of the total number of personnel employed at the Royal Aircraft Establishment as 1,316, of whom 270 were scientific and technical staff, 85 clerical staff, 626 skilled mechanics, and 335 labourers.

Also on May 18th Capt. Guest said that Commander Burney had been informed that in the opinion of the Air Council his scheme for an Imperial Airship Service was a notable improvement on previous propositions and that in the event of the scheme being adopted the question of adequate technical control by the Air Ministry would receive full consideration.

On May 18th Mr. Baldwin Raper asked the Secretary of State for Air whether his attention had been drawn to the fact that a certain firm of bankers were endeavouring to recover from ex-officers. money which was paid to them in error by that firm a considerable time ago and accepted by them in good faith and Captain Guest replied that inquiries would be made.

On May 20th Their Majesties the King and Queen visited the R.A.F. Units at Farnborough and witnessed demonstrations of war-flying and the uses of aircraft in war.

In the *London Gazette* of May 23rd it was announced that Sir Hugh Trenchard had been promoted to the rank of Air Chief Marshal (April 1st), thus promoting the R.A.F. to the importance of a full General's command.

It was made known in THE AEROPLANE of May 24th that Air Vice-Marshal Sir J. M. Salmond was proceeding to India at the end of the month to inquire into the work of the R.A.F. in India prior to his taking command in Iraq.

CIVIL AVIATION.—On May 1st Mr. Herne flew to Paris and back twice on a Napier-engined D.H.34 of the Daimler Airway. His total flying time was 8 hours 37 mins. This was the first time that the double journey had ever been accomplished in the day. It was also the first sign of Col. Searle's new intensive methods.

It was announced in THE AEROPLANE of May 10th that Major-General Sir Sefton Brancker had been appointed Controller-General of Civil Aviation. Later it was stated that his title would be "Director of Civil Aviation."

On May 16th Sir Sefton Brancker made his first official appearance as Director of Civil Aviation when he christened the two Handley Page W.8bs. "Princess Mary" and "Prince George."

The resignations of Wing-Commander W. D. Beatty and Lieut.-Colonel W. O. Raikes, Deputy Controllers of Information and Planning in the Dept. of the Controller-General of Civil Aviation were reported in THE AEROPLANE of May 17th.

AERONAUTICS OVERSEAS.—On May 5th certain of the restrictions imposed by the *Commission Aéronautique Interalliée* on the manufacture of German aircraft were withdrawn.

An article in THE AEROPLANE of May 3rd described the excellent work that was being done by the Aerial Survey Company in Newfoundland under the command of Mr. F. Sidney Cotton.

In THE AEROPLANE of May 10th appeared a leader dealing with South African aviation and the extremely good work done by the S.A.A.F. during the recent Revolution on the Rand.

Beginning on May 25th and lasting for four days an aviation meeting was held at Le Bourget, many well-known pilots and a number of interesting machines taking part in the competitions.

A small Aerial Pageant was held at Geneva on May 31st by the Swiss Military Flying Corps.

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Jan. 14th.

LONDON—PARIS :

Handley Page Transport, Ltd., machines 4*, passengers 18. C.M.A. Air Lines, machines 3†, passengers 5. Cie Grand Express Aeriens, machines 1*, passengers 3. Total machines 10, passengers 30.

LONDON—OSTENDE—COLOGNE :

Instone Air Line, Ltd., machines 4*, passengers 7.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 11, passengers, Manchester-London, 7, London-Amsterdam, 4.

LONDON—ROTTERDAM :

K.L.M., machines 7, passengers 7.

SPECIAL MACHINES. LONDON—BERLIN :

Junkers, machine 1, passengers 0.

LONDON—PARIS :

De Havilland Aircraft Co., machine 1, passengers 2.

Total number of trips by British machines : 20, carrying 38 pas.

Total number of trips by foreign machines : 14, carrying 15 pas.

Trips per day.—Monday, 4; Tuesday, 4; Wednesday, 11; Thursday, 9; Friday, 5; Saturday, 1; Sunday, 0.

STATISTICS.

Machines, 34; Passengers, 63; Crews, 65; Total Personnel, 128.

Corresponding week last year :—

Machines, 31; Passengers, 51; Crews, 50; Total Personnel, 101.

Corresponding week, 1921 :—

Machines, 27; Passengers, 30; Crews, 32; Total Personnel, 62.

* These machines also carry loads of freight.

† Some machines are freighters only. C.M.A. Air Lines run an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

ANYTIME'S GUESSING TIME.

Statements have appeared in the daily Press this week to the effect that various alterations to the aerodrome are to be made forthwith. The old military aerodrome on the west side of Plough Lane is to be taken over and used as an arrival "platform" keeping the present site as departure "platform." All sorts of other grandiose schemes have been put forth as almost accomplished facts. One gathers that these and numerous other schemes have received consideration by the Department of Civil Aviation but so far nothing definite has been decided.

MAKE HAY MAKE THE SUN SHINE.

On Monday and Tuesday last week the weather was very bad on all routes. A Fokker and a Daimler D.H.34 got through one in each direction between Holland and England on Monday and again on Tuesday a C.M.A. "Goliath" left for Paris on Monday but was unable to complete the journey until the following day.

CORRUGATED CAROLINE COMES.

On Wednesday the all-metal Junkers monoplane arrived from Germany piloted by Herr Frantz. It was of the ordinary familiar Junkers commercial type which has already been illustrated in THE AEROPLANE. It will be described and the details illustrated in an early issue.

When it arrived on Wednesday many people received the impression that the machine though otherwise orderly was proceeding in an inverted position. The evening previous to her arrival she landed at Lympne having flown thither non-stop from Gelsenkerchen in Germany. She landed on a bad patch of aerodrome and stuck fast in the mud and so she was picketed for the night where she stuck.

"AND WHEN HE FALLS, HE FALLS LIKE LUCIFER."

On Thursday there was a rather pathetic parade of the Air Ministry's white elephants, which made people think that there was a jumble sale on. This herd of elephants has been increased considerably of late. In addition to the poor old competition Westland and Viking III there are now two engineless and superannuated D.H.18s, RO and WO. Then there is a spare and engineless D.H.34, which, one hopes, will soon see service with an air line as it is a brand new machine and has only flown from Stag Lane to Croydon. The last machine, the Bristol 10-seater with Napier engine, is perhaps the saddest case of all. She did much good service on the Handley Page Paris route early last year and was then sent back to Bristol for overhaul, whence she returned last September in perfect condition.

She is a trifle slow for air line work and the Bristol company does not one gathers look upon her with favour as in their minds she is superseded by the type with the Bristol "Jupiter" engine. Therefore it sems that she and the remaining elephants of hoary hue will emulate the fate of old soldiers who, it will be remembered, never die but simply fade away (with the accentuation equal on both "A's").

THE DISPOSAL COMPANY.

The Aircraft Disposal Company are very busy in the shops on D.H.9's and 9a's. Capt. Stocken tested a D.H.9 on Monday last. Mr. Perry had the same machine up on Tuesday and again on Wednesday. On Thursday Mr. Piercey left on it for Dublin

"A ROSE BY ANY NAME——"

It has been decided that the Amalgamated Cie des Grandes Express Aeriens and Cie Messageries Aeriennes shall be known for short as the "Air Union" though they will still continue for the present as G.E.A. and C.M.A. when reference is made to them individually.—G. D.

The Stanmore Accident.

On Wednesday, Jan. 10th a D.H.16 (Rolls-Royce engine) piloted by Mr. R. E. Keys was making a test flight from Stag Lane Aerodrome. When over Stanmore a connecting rod broke and stopped the engine. Mr. Keys who was then flying down wind at a height of about 300 feet turned up wind in the endeavour to reach a suitable landing place. The machine stalled on the turn and dived straight into the ground. The fall was so nearly vertical that the undercarriage was not removed by the crash.

There were four of the De Havilland Company's mechanics on board as passengers. The pilot, who in the D.H.16 sits in front under the upper plane, was killed and one of the passengers, Mr. L. Arnell was also killed by breaking his neck. The other three passengers were severely injured but are now reported to be doing well.

Mr. Keys joined the R.N.A.S. in 1914 as a rating and served with airships doing in all about 400 hours before transferring to aeroplanes in 1917. He took his aeroplane certificate in a remarkably short time and thereafter was employed largely on experimental work. While at Felixstowe he carried out tests with dropping undercarriages, doing this successfully with a Sopwith "Camel," afterwards landing in the water. He was also the first officer to be dropped with success off an airship in an aeroplane, also on a Sopwith "Camel" from R.23.

In the last big Zeppelin raid over the Eastern Counties in August 1918 he shot down one airship and damaged another on a D.H.4 for which he was awarded the D.F.C.

On the cessation of hostilities he was given a permanent commission, and was sent to the Caspian Sea in Group-Capt. Bowhill's command. On his return to England he was posted to H.M.S. *Argus* and while with this ship made experimental deck-landings with D.H.9as on H.M. S. *Eagle*. He was then sent to Irak and posted to No. 8 Squadron and flew over the Cairo-Baghdad mail route. He resigned from the R.A.F. in Nov., 1921.

In May last year Mr. Keys joined the Instone Air Line and created a most favourable impression by his handling of the D.H.18 at his first attempts. He made a long flight to Brest on the D.H.4a with a press photographer to obtain some photographs of a wrecked ocean liner. The machine ran out of petrol near Brest in semi-darkness and was damaged on landing. In June when he was flying from Brussels to Croydon on a Vickers "Vulcan" he ran out of petrol when over Tonbridge and stood the machine on its nose when landing.

After that he joined the De Havilland Company and had up to the time of his death done much good work on their air-taxi service.

His was a popular personality and his death will be very much regretted by his many friends.

SPANISH REQUIREMENT.

British firms desiring to tender for the 90 military aeroplanes required by the Spanish Royal Flying Corps will be interested to note that these 90 machines are in addition to the numerous Fokker, Nieuport and Breguet machines which have been ordered by the Spanish Army within the last few months.

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FOR SALE.—R.A.F. Officer's (retired) Mess Kit, £5; new overcoat, £5; service dress, and various; cheap. List.—Box No. 5067, THE AEROPLANE, 14, Bream's Buildings, E.C.4.

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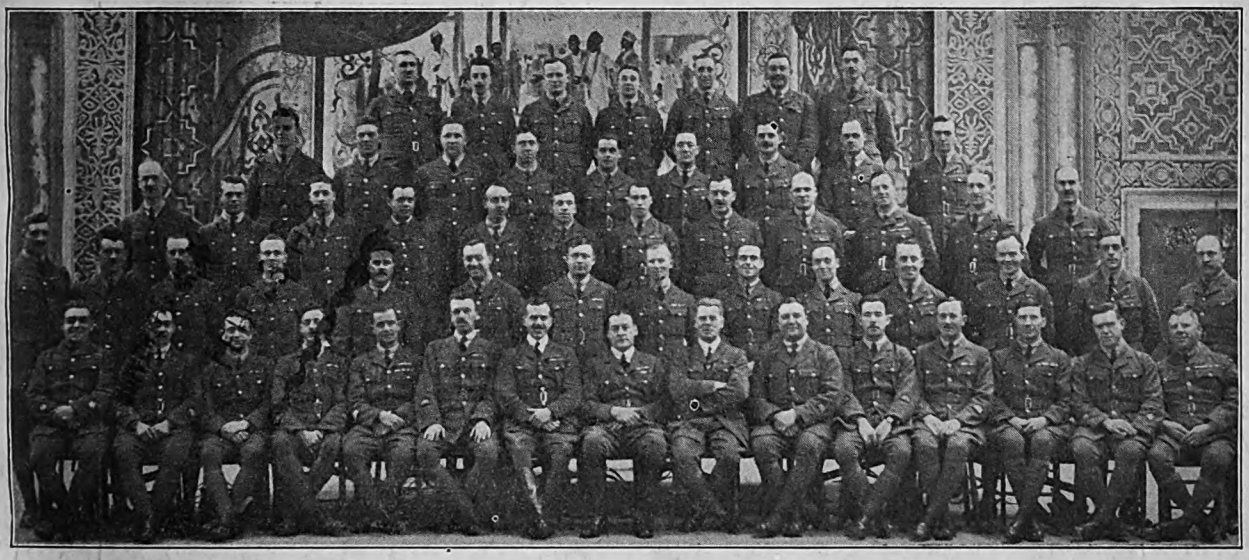
A CHRISTMAS PARTY.



THE SCHOOL OF TECHNICAL TRAINING (Men) at Manston, Thanet.—The Serjeant's Mess, with the O.C., Wing Commander J. H. A. Landon, D.S.O., O.B.E., in the middle of the front row.

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ON SERVICE THROW-OUTS.

It would appear that the R.A.F. is still short of officers. One would expect this to be regarded as good news by the large number of young and keen men who want to fly but are too old to enter as cadets at Cranwell. It is true that such commissions as are open are for Short Service people only, but a man who has confidence in himself is always game to take a Short Service commission and trust to his ability to make him indispensable in the R.A.F. so as to get him a permanent commission. Judging by one's own limited circle of acquaintanceship there must be far more people wanting to join the R.A.F. than the R.A.F. can possibly accommodate.

But somehow there seems to be a catch somewhere in this demand for officers. The latest document issued by the Air Ministry appears to indicate that the Personnel Department does not want ex-officers of the R.A.F. who are already trained pilots with war experience, nor does it want keen energetic young men with engineering or public school training. The particular desire of the Personnel Department at the moment seems to be to fill up all vacancies with the throw-outs of the Navy and Army, and to make the R.A.F. a sort of home for lost dogs. Here is the document in question :—

A.M. No. 819.

R.A.F. SHORT SERVICE COMMISSIONS.

OPENINGS FOR RETIRED OFFICERS OF OTHER SERVICES.

The Air Ministry make the following announcement :—

The Air Council have decided to offer a certain number of short service commissions in the General Duties Branch of the Royal Air Force to officers of the Royal Navy, Royal Marines and Army retired under the special retirement schemes as being surplus to the requirements of those Services. The Council hope that by this means officers whose careers in a fighting service would otherwise be terminated may be enabled to continue for a futher period in the service of the State.

The following is a general outline of the conditions :—

The officers who are eligible for such commissions are executive officers of the Royal Navy and officers of the Royal Marines retired under the terms of Admiralty Fleet Order No. 1358 of May 12th, 1922, and officers of combatant branches of the British Army retired under the terms of Army Order 179 of 1922. They must not exceed the age of 26 at the time of entry into the Royal Air Force and must be physically fit for full flying duties.

Employment will be for seven years on the active list on the completion of which officers will be under no obligation of reserve service in the Royal Air Force. The Admiralty and War Office have agreed to suspend the liability of these officers to recall to their parent service during an emergency for such period as they are in the Royal Air Force Service.

Officers will be granted commissions in the General Duties Branch of the Royal Air Force as Flying Officers. The Air Council reserve the right to dispense with the services of any officer who is reported as not being likely to make an efficient Royal Air Force officer during his period of instruction. Such officer would automatically revert to his status in the Regular Army Reserve of officers.

During this period officers may wear either Royal Air Force uniform or the uniform of their former service. On completion of their course of instruction they will be required to wear Royal Air Force uniform and will be paid an allowance of £25. Officers will be eligible for promotion in the Royal Air Force in which force promotion is by selection. They will also be eligible under certain conditions for transfer to a permanent commission in the Royal Air Force; such transfers are, however, necessarily made very sparingly.

Officers who held the substantive rank of Lieutenant in the Royal Navy or Captain in the Royal Marines or the Army will be eligible for the grant of honorary rank as Flight Lieutenant if recommended by their Commanding Officers at any time after completing their training courses.

Officers will receive the pay and allowances of their substantive rank in the Royal Air Force and will be eligible under Air Force regulations for terminal gratuity at the rate of £75 for each year of service on their short service commissions.

Officers will be allowed to enjoy the benefits of any gratuity drawn by them on retirement from the Royal Navy, Royal Marines or Army without any deductions from their Air Force pay in respect of the annuity value of such gratuity. Any retired pay in respect of Naval or Army service will be suspended during their Royal Air Force service but will be resumed (without any increase for further length of service) on leaving the Royal Air Force. Officers who have commuted their retired pay or a portion of it will be dealt with under special regulations.

Forms of application may be obtained by applying in writing to the Secretary, Air Ministry (S.7.), Kingsway, W.C.2.

An Erroneous Policy.

With all due respect to the Air Council, which has done wonderfully good work during the past two or three years, one takes leave to disagree entirely from this latest move and one submits that it is an erroneous policy which is not likely to do any good to the R.A.F. and may very possibly do it considerable harm. Of course a mere personal opinion of this sort cannot possibly carry any weight with such an august body as the Air Council, but one puts it on record just for the satisfaction of saying "I told you so" at some future date.

In the first place the R.A.F. ought to be the first of the King's Armed Services on the excellent principle that to have *been* first merely proves antiquity whereas to have *become* first proves merit. The R.A.F. is our First Line of Defence and therefore should have the finest personnel, both officers and men.

Now the Navy and the Army each has many more officers than has the R.A.F. One does not know the precise figures for each Service, but one does know that the R.A.F. has about 3,000. Let us assume then that the best 3,000 in the Navy and the best 3,000 in the Army are mentally and morally and physically as good as the 3,000 in the R.A.F. Then it is fairly clear that the next few thousand who constitute the rest of the Navy and the next few thousand who fill the establishment of the Army must be inferior to the least good officers in the R.A.F. And it follows logically that those who have been retired under "Admiralty Fleet Order No. 1358" and under "Army Order No. 199," otherwise those cut off by the "Geddes Axe," must be inferior again to the balance of Navy and Army officers.

Or let us put it another way. Divide the officers of the King's Services into three grades, "A," "B," and "C." "A" represents the 3,000 best officers in the Navy and Army and all the officers in the R.A.F. "B" represents the officers remaining in the Navy and Army in excess of the total number in the R.A.F. and of somewhat inferior calibre "C" represents those officers of the Navy and Army who are not considered good enough for Class "B," and have consequently been thrown out.

What this Air Ministry Order No. 819 really means is that the Air Council proposes to fill up the commissioned ranks of the Air Force with Class "C" officers from the Navy and Army. And one submits to the Air Council that the First Line of Defence cannot afford to have Third Class Officers.

Spurious Reputations.

There is an old story told of the late Frank Burnand, the man who made *Punch* what it is, the World's greatest philosophical periodical. Some *laudator temporis acti* said to him regretfully "*Punch* isn't what it used to be." Whereto Burnand replied "No, my boy! It never was!"

Which is equally true of most things, especially of the British Navy and to some extent of the Army. But even allowing that the Navy was never anything like what it was supposed to be on the strength of heroic stage sailors and skilful newspaper propaganda by the "Silent Service" itself, and even admitting that the British Army was not officered before the war entirely by people who were a compound of Clive, Roberts, Kitchener and Fred Burnaby, it is a lamentable fact that the officers of to-day are not up to the pre-war standard.

If any doubt should be felt about the relative quality of R.A.F. officers and Army officers it is only necessary to look

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at the figures for the recent entrance exams. for Cranwell and Sandhurst. Naturally the average Cranwell cadet is not up to Woolwich standard, but the marks show that he is intellectually far above the average Sandhurst standard. And if the lowest Sandhurst cadet is considered good enough to replace the Class A. resignations from the Army then he must be considered superior to the Class C. people with whom the Air Council wishes to fill up the Air Force. Which means that the Air Council, by way of the Personnel Department, is inviting into the R.A.F. a lot of people who are intellectually inferior to the lowest class cadet at Cranwell. Which is obviously absurd.

The Age Limit.

It will be noticed in Air Ministry Order No. 819 that the maximum age at which these Class C. throw-outs from the Senior Services may enter the R.A.F. is twenty-six. One suggests that it is both too high and too low. It is too high for the age at which to take a short service officer and teach him to fly and become an R.A.F. officer and it is too low for the age at which some advantage might conceivably be gained by the R.A.F. through importing officers with the proper tone of the Senior Services—if anything is to be gained in that way, which one very much doubts.

Incidentally, it seems at first sight an exceptionally silly idea to train an officer for seven years and then have no claim on him for the Reserve. As a matter of fact in a big war he would simply be conscripted back to the Air Force if still fit, so this clause seems to indicate a disingenuous intention on the part of the Personnel Department.

So far as the age limit being too high is concerned, it must be fairly obvious that if you take a man of 26 who knows nothing about flying and start to teach him from the beginning by peaceful Peace-time methods it is going to be a matter of three years before he is a competent pilot and an all-round airman (using the word in its correct sense.) And even then one would rather fly with an ex-R.A.F. War-time pilot of 30 or 35 who had had six weeks' practice on modern machines than with an ex-Naval or ex-Army officer of 29 with three years' Peace-time training.

Consequently one fails entirely to see any advantage in taking in Class C. throw-outs of 26 as against taking in ex-R.A.F. officers of 30 or more who would have been Class A. officers in the R.A.F. if they had not been forcibly demobilised in 1919 or 1920.

War-Time Influences.

As regards the age limit being too low, it is equally obvious that a former Naval or Army officer of 26 is not of the pre-war quality. If he has reached the maximum age of 26 "at the time of entry into the Royal Air Force" he would have been less than 18 years of age at the beginning of the War 1914-18. Which means that he would not have come through the pre-war Sandhurst, and would only have been a midshipman in the pre-war Navy. And presumably nobody is going to pretend that a young officer who acquired all his Service experience, even as a Regular officer, during the War has any particular social or educational advantage over the contemporary R.N.A.S. or R.F.C. officer.

It is true that a midshipman R.N. who served with the regular Navy from 1914 and is now thrown out as a Class C. two-striper will have acquired the proper Service outlook as understood by the Navy. But that outlook, acquired chiefly through a port-hole in a tin case in the course of eight years mostly spent in harbour, is scarcely what is needed in the R.A.F.

The Air Force officer may not be the perfect exemplar of the English gentleman, but one cannot conceive that he will be greatly elevated by introducing to him the manners and customs and conversation of the Naval ward-room. And anyhow the R.A.F. does not want what may be called the fringes or outsquirts of the Fleet.

And though the lad who at 18 or less did a six week's course at Sandhurst may have spent the best part of the ensuing four years in trenches in France and a goodly portion of the next three labouring through Russian snows or the dust of Mesopotamia or the rocks of the North-West Frontier, he has not had a chance of acquiring that social tone and mental poise and military learning which would make him a valuable acquisition to an R.A.F. mess. He may have seen a lot of fighting, but his view of it has been necessarily circumscribed and so he cannot have learned as much of war as has any contemporary ex-officer of the R.A.F. Moreover it must always be remembered that if he had attained to the level which would make him genuinely valuable to the R.A.F. he would not have been allowed to leave the Army.

A Source of Danger.

On the whole therefore one can see no possible advantage in this latest scheme for filling the commissioned ranks of the R.A.F. On the contrary one can see very many disadvantages. In the first place, apart from the fact that the R.A.F. does not want officers who are worse than the worst class remaining in the Senior Services, these Class C. throw-outs will necessarily come out of their former Services with a grudge against those in authority who threw them out. And when once a man has joined the disgruntled officer class there is no hope for him. For the moment these people may feel grateful to the R.A.F. for giving them a home, but the first time anything goes wrong they will feel they have another grievance and will become centres of discontent.

Secondly, they will never become whole-hearted R.A.F. officers. Seven years in the R.A.F. is not going to wipe out the effects of even four or five (and possibly eight) years in another Service at a more impressionable age. The ex Navy man will always be more of an N.O. than anything else and he will always be liable to side with any faction which arises in favour of giving the sea-going R.A.F. back to the Navy. And if the War Office ever conceives an ambition to revive the Royal Flying Corps the ex-soldiers will feel inclined to side with them. In fact the scheme is very likely to undermine the loyalty of the whole Air Force. In any case it is introducing fresh warring factions.

Even to-day though nearly all the former Naval officers in the R.A.F. would hate to go back to the Navy even as senior officers of a revived R.N.A.S. they still believe deep in their hearts that the slipshod methods (which they conceive to be free and easy) of the Navy are better than the clear-cut neat and orderly methods of the Army (which they regard as hide-bound). And no R.A.F. station commanded by an ex-Naval officer (barring Marines, of course) has ever been as smart in appearance and in operations as those commanded by ex-Army officers. There is always the ingrained difference between the basic methods of the two Services.

Left to themselves these differences would disappear. R.A.F. officers formerly of the Senior Services would retire or become so high in rank that their early habits would not affect the details of R.A.F. life and work. But by importing these jetsam of the Senior Services all the old rivalry and disagreement will be maintained.

A Needless Scheme.

There is in fact no need for this scheme. The prompt response of ex-R.A.F. officers to the call of the Air Ministry at the time of the threatened "Triple Alliance" Strike showed that the R.A.F. can have more officers than it wants. Also there are plenty of keen youngsters who are too old for Cranwell but who have not yet had time to learn bad habits in other professions who would willingly join the R.A.F. if they had the chance.

Possibly the Personnel Department does not agree. If that be the case then one recommends the Personnel Department to take a wider view of its surroundings and of the requirements of the R.A.F. The present scheme is entirely wrong and if the present Personnel Department does not recognise the fact then it is time we had a new Personnel Department.

—C. G. G.

THE IRISH FREE STATE.

A special correspondent of the Press Association in the Irish Free State telegraphing on January 17th stated that one of General Mulcahy's aeroplanes which was carrying out reconnaissances in the Kerry area was fired on by Irregulars. The report does not state whether the Irregulars were using anti-aircraft guns or rifles. The pilot replied with a machine gun and the Irregulars were obliged to retreat. At any rate it is useful to know that the Free State has one unit which is not afraid to attack an enemy.

ROUND THE WORLD.

Mr. Norman MacMillan and Mr. Geoffrey Malins are to set out shortly on an attempt to fly round the world. The makes of the machine and engine are not disclosed yet nor is the name of the third member of the crew who will be a useful member and not merely a passenger.

The scheme is being financed by the Legion of Frontiersmen and much of the organisation is in the hands of that eminent filibuster and good sportsman Mr. Roger Pocock.

This venture of "Mac and Jeff" will be watched with very great interest. Mr. MacMillan is one of the world's great pilots and he gained very useful experience on his recent flight to India. Mr. Malins also gained much experience on that flight and proved himself to be of very real use on such an expedition in addition to taking good photographs.

Everyone will wish the best possible success to the flight.—

C. D.

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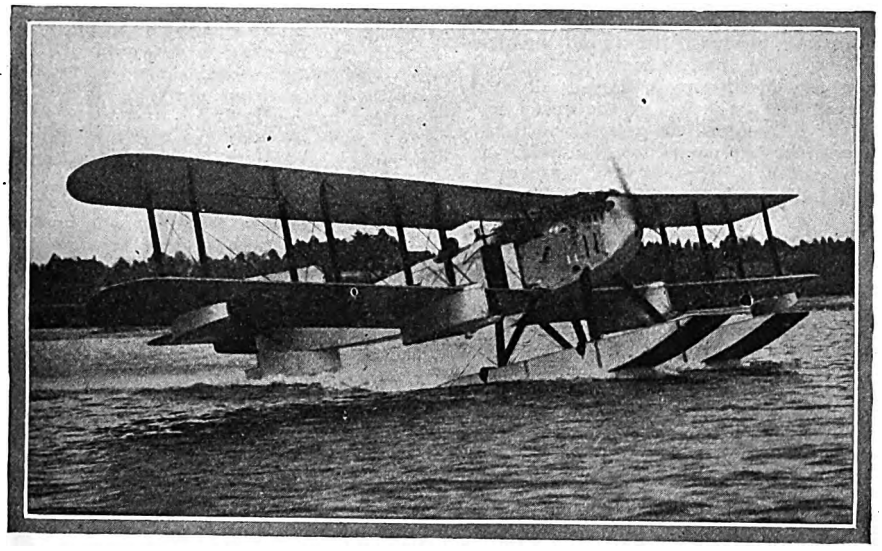
ACROSS THE SOUTH ATLANTIC



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THE REVIEW OF THE YEAR (*Compiled by M. H. & G. D.*)

JUNE 1922.

SERVICE AERONAUTICS.—In the list of the King's Birthday Honours published on June 3rd appeared the following names of Air Force Officers: C.B.: Air Commodore J. M. Steel, C.M.G., C.B.E.; Second Bar to Air Force Cross: F/Lt. P. W. S. Bulman, M.C., A.F.C.; Air Force Cross: F/Os. W. F. Dickson, D.S.O., A. G. Jarvis and A. R. M. Rickards.

On June 7th THE AEROPLANE reproduced from sundry papers a weird tale about the success of the much-advertised Brennan Helicopter and pointed out that Mr. Brennan himself admitted that his machine had never left its shed. At the same time disbelief was expressed in helicopters in general and Mr. Brennan's in particular and further payment of subsidies to Mr. Brennan or other makers of helicopters was deprecated. In the ensuing six months nothing has occurred to alter this point of view.

In THE AEROPLANE of June 14th there appeared a review on Sir Frederick Sykes' book, "Aviation in Peace and War," demonstrating many fallacies therein.

The awards for the 1921 competition for the R. M. Groves Memorial Essay open to all members of the R.A.F. were announced in THE AEROPLANE of June 14th as follows: 1st prize, Wing Commdr. C. H. K. Edmonds, D.S.O., O.B.E.; 2nd prize, Wing Commdr. R. H. Verney, O.B.E.; 3rd prize, F/Lt. W. P. Groves, to whom the special prize was also awarded.

On June 19th the Fourth Annual Dinner of the Independent Force R.A.F. was held at the Hotel Cecil, the Chair being taken by Air Chief Marshal Sir Hugh Trenchard, Bart., K.C.B., D.S.O., A.D.C., supported by Group Captain H.R.H. the Duke of York, K.G., G.C.V.O. The guest of the evening was General de Castelnau.

On June 21st Lieut.-Commander Gregory, R.N., one of the first four officers under the Admiralty who learned to fly at Eastchurch in 1911 died in Hongkong.

On June 23rd the R.A.F. Gathering, which was the first general reunion of officers of all the Flying Services past and present, was held, the Chair being taken by Air Vice-Marshal Sir Geoffrey Salmond. As a result of this Dinner, which was a great success, the R.A.F. Dinner Club was formed with the idea of organising a similar gathering annually.

On June 24th the R.A.F. Pageant was held at Hendon. The highest praise is due to the R.A.F. not only for carrying out the proceedings in defiance of the pouring rain but for demonstrating so effectually that its flying is equally efficient under any climatic conditions. It is a matter of regret that one cannot here describe all the events on the programme, which was a most excellent one. The most illuminating event was a fight between S/Ldr. Roderick Hill on a D.H.10 and F/Lts. Bulman and Grinnell-Milne on two S.E.5as. Despite the unpopularity of the D.H.10 among R.A.F. pilots there was no doubt that it had the upper hand in the fight. F/Lt. Longton on a wonderfully painted Avro enlarged on F/Lt. Noakes' crazy flying of the previous year.

On June 27th the Royal Aero Club held its "Coming-of-Age" banquet at the Savoy with its President the Duke of Atholl in the Chair. Lord Gorell, the Under-Secretary of State for Air proposed the toast of the Royal Aero Club and said that the independence of the R.A.F. had been confirmed and that he felt he could defend the Air Ministry successfully even under the critical eye of Gen. Groves and the reproachful eye of Mr. Handley Page. The Duke of Atholl replied and after saying that Lord Gorell was approaching the age of regretting his misdeeds he referred to the pioneer work done by various members of the Club for Aviation. Lord Weir in a very interesting speech defended the policy of the Air Ministry especially against the attack made on them with reference to "France's 250 Squadrons." He said that while the R.A.F. Pageant had shown that the R.A.F. were no fair-weather birds the R.A.F. could not live much longer on old war machines. Monsieur Flandin formerly French Under-Secretary of State for Air, Vice-Admiral Sir Roger Keyes, Lieut.-Gen. Sir Travers Clarke, Air Chief Marshal Sir H. M. Trenchard and Lieut.-Col. Moore-Brabazon the new Chairman of the R.Ae.C. also spoke.

On June 27th Air Commodore L. E. O. Charlton was posted from the British Embassy Washington to the R.A.F. Depot and Group Captain Hearson from the British Delegation in Paris to the R.A.F. Depot. Wing-Commdr. W. G. Christie replaced Air-Commodore Charlton as British Air Attaché at Washington.

On June 29th the Secretary of State for Air told Mr. A. T. Davies in the House of Commons that the machines used at the Hendon Pageant with the exception of the experimental machines were not less than four years old: that some of the squadrons abroad have been partly rearmed with new aeroplanes and that the four squadrons working with the Navy are being completely rearmed. He also told Admiral Sueter that with the exception of the Vickers type all the machines on the Desert Route were of 1918 or 1919 build. Sundry other M.P.s asked a variety of questions on the same date showing quite an intelligent interest in aviation.

Royal Air Force promotions gazetted on June 30th included Air Commodore Oliver Swann to be Air Vice-Marshal and Group Capt. T. C. R. Higgins to be Air Commodore.

CIVIL AVIATION.—On June 3rd the Royal Aero Club held its second race meeting of the year. Owing to the fact that so many aeroplane enthusiasts preferred to attend motor meetings rather than air meetings it was decided to hold this meeting on the Saturday instead of on the Bank Holiday to avoid clashing with the motor race meeting at Brooklands. In spite of perfect weather the enclosure was sparsely populated, which served the Aero Club right for pandering to the motor-mongers.

On the same day a Spad which had left Croydon to fly to Paris dove into the sea off Folkestone and the pilot, M. Morin and two passengers were killed. No definite explanation of the crash was ever found but the most probable solution seemed to be the fact that one of the passengers in a fit of mental derangement shot the pilot.

On June 2nd a D.H.34 (Napier "Lion" engine) belonging to the Daimler Airway broke all records by making five single trips between London and Paris in a day, and in the same week the Vickers "Vulcan" made her first trip to Paris as an air liner

The de Havilland Aircraft Company in connection with the Horse Derby delivered cinematograph films and photographs of the event to practically all the big English and Scottish towns. Not a single trouble of any sort was encountered in any of the machines.

On June 7th photographs were published for the first time of the air-flow round a slotted wing of the Handley Page type, the results being most convincing.

On June 12th the last really fine summer day of the whole year occurred. Had the full significance of this epoch-making day been fully realised it would doubtless have been better celebrated.

On June 7th M. Labouchère came over from Paris by night on a "Goliath" and returned again before dawn. This was the first commercial machine to make the night trip.

On June 15th Col. Ogilvie delivered before the Royal Aeronautical Society the Tenth Annual Lecture to the memory of Wilbur Wright. The lecture chiefly consisted of a discourse on the work of the Wright Brothers and the lessons to be derived therefrom.

It was announced on June 21st that Mr. C. R. Fairey, M.B.E., Chairman of the Fairey Aviation Company Ltd. had been elected Chairman of the Society of British Aircraft Constructors for the year 1922-23 vice Sir Henry White Smith, C.B.E., who had been Chairman since the formation of the Society in 1916. Capt. P. D. Acland (Vickers Ltd.), was elected Vice-Chairman and Squadron Commdr. James Bird (the Supermarine Company), Honorary Treasurer.

Early in June the first public exhibition of sky-writing was given. The moving spirit in the concern running this novel form of advertising was Major J. C. Savage who in pre-War days was manager for the late Mr. B. C. Hucks, and has for many years been perfecting this means of Sky-writing. The invention has been patented all over the World and Major Savage is now reaping the reward of his labours.

An important announcement was made on June 21st when it was recorded that an agreement had been made between the Supermarine Aviation Works Ltd. and the London and South Western Railway Ltd. to run a join Air Line between Southampton and Le Havre, Cherbourg and the Channel Islands. This was the first occasion on which a railway company had become actively interested in aviation.

Mr. Alan Cobham who had flown to Belgrade to obtain some Press photographs returned from that city to London within 24 hours. Much of the flight was made in the dark and all of it was made in thunderstorm and much fog.

AERONAUTICS OVERSEAS.—On June 1st the Belgian S.N.E.T.A. Company closed down and from its ashes rose the Société Anonyme Belge de Constructions Aeronautique and the Société Anonyme Belge d'Exploitation et de la Navigation Aerienne, known.

On June 5th Com. Saccadura Cabral and Capt. Gago-Continho arrived in a Fairey seaplane at Pernambuco from Fernando Noronha, thus succeeding in covering by air the course across the Atlantic from Lisbon, though part of the course was only covered in the reverse direction.

On June 28th attention was directed to inconsiderable news paragraphs in the daily Press recording that the South African Forces including the South African Air Force were engaged in warfare against Hottentot tribes in what used to be German South West Africa.

(*To be continued.*)

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

A paper on Flying Boats, read before the Royal Aeronautical Society by Major D. Rennie, is very briefly reported below. The paper itself contains a large amount of extremely useful technical information which unfortunately cannot be reproduced here owing to lack of space. It is devoutly to be hoped that the complete paper, and the report of the discussion thereon, will—when it is published by the Royal Aeronautical Society—have a wide circulation among all those areonautical engineers who have little or no practical experience of the Flying Boat.

Major Rennie is undoubtedly correct in claiming that the develoment of this particular type of aircraft has been arrested solely by the general ignorance of its capabilities, and his attempt to dissipate that ignorance one hopes will meet with the success which it deserves.

A note and some illustrations concerning the Junkers commercial monoplane which recently visited Croydon appears in this issue. The general features of this type are already so well known that a general description is not necessary. At the same time inspection of an actual machine allows one to appreciate certain details in a manner which is not possible from the descriptions which have so far been published.

THE DESIGN, CONSTRUCTION AND OPERATION OF FLYING BOATS.

A very interesting paper bearing the above title was read before the Royal Aeronautical Society on January 18th by Major J. D. Rennie.

Major Rennie was for some time during the war Chief Technical Officer at Felixstowe under the late Col. John Porte, and in view of the immense development of the flying boat which took place at that station, he has undoubtedly enjoyed unusual opportunities of acquiring a thorough knowledge of this particular subject.

The Field for the Flying Boat.

The paper opens by pointing out that owing to their operations being out of the limelight, the work of the flying boats during the war is little known and appreciated, and in consequence their potential value for commercial purposes has perhaps been underestimated. It is pointed out that over longish sea routes the flying boat at 80 knots is four times as fast as the steamer of 20 knots, whereas the aeroplane cruising at 95 m.p.h. has to compete with trains averaging 40 m.p.h.

Given properly sheltered terminal harbours the flying boat can operate in worse weather than the aeroplane, and at night or in fog even with a moderately rough sea, a flying boat which has a decently shaped and built hull can alight with complete safety on the water.

The Flying Boat as efficient as the Large Aeroplane.

Critics of the flying boat claim that in performance the type is less efficient than the land aeroplane. This is so with single-engined boats, owing to the interplane engine mounting, a feature which is apparently unavoidable—and as a matter of fact the general aerodynamical and detail design of the average flying boat is usually much inferior to that of the average land machine—owing to lack of experience of boat design.

But with large multi-engined machines the flying boat shows no inferiority in efficiency.

Comparing the F.5 seaplane with the Vickers "Vimy," Major Rennie states that at 95 m.p.h. at 2,000 ft. the F.5 carried 21.2 lbs. per h.p. and the Vimy only 17.4 lbs. The body resistance of the flying boat was generally lower than that of the fuselage of a commercial aeroplane of similar size, and a detailed comparison of the weights of representative flying boats and land aeroplanes of roughly equal total weight showed that the useful load of the flying boat averaged 40.5 per cent. of the total as against 38.5 per cent. for the large aeroplane.

The author mainly confined his remarks to the orthodox type of flying boat, with biplane wings, tail carried by the hull, and interplane engine mountings, and in particular to boats of over 4,500 lbs. displacement—as he holds that for sizes below this figure the float seaplane appears to have an advantage over the boat type. The paper then proceeds to discuss—at far too great a length to allow of even a "precis" in the limited space here available—the aerodynamic problems of the flying boat, and the design and construction of hulls to secure the essential features of seaworthiness, controllability on the water and safe and easy taking off and alighting. This part of the paper contains very much useful and interesting information, together with certain expressions of personal opinion from which it is easily possible to differ.

Equipment for Flying Boat Services.

The paper concludes with certain remarks as to operational equipment for use with flying boats. During the war flying boats lived in sheds, and were usually manhandled on to trolleys for launching and bringing ashore. With large boats this means high labour costs, large shed accommodation, and inevitable damage to hulls caused by handling accidents.

To some extent boats have been kept at moorings between flights, coming ashore only for repairs and overhaul. This greatly reduces the cost of sheds, trolleys, slipways and handling parties. Boats not specially designed for such treatment stand up to it fairly successfully, the fabric covering giving most trouble.

The main difficulty for commercial purposes is to be experienced in embarking and disembarking goods and passengers. A motor boat has to come alongside and under moderately rough conditions there is some considerable risk both to passengers and to the flying boat.

A Forecast.

The present types of flying boat were found to be satisfactory in regard to hull endurance, but the wing structure was far too fragile and complicated. A robust and compact structure seemed to be possible, using a biplane with a small gap/chord ratio, engines abreast in the upper wing, thick section internally braced wings, small chord lower wing, external wing bracing to outer engines only, and either wooden or duralumin wing covering.

If robust craft of this type were available, the mooring-out system combined with the use of a floating landing stage embodying floating docks for the machines would be a satisfactory arrangement. The boats would be moored except to take on or discharge load, or for repairs, when they could enter the docks.

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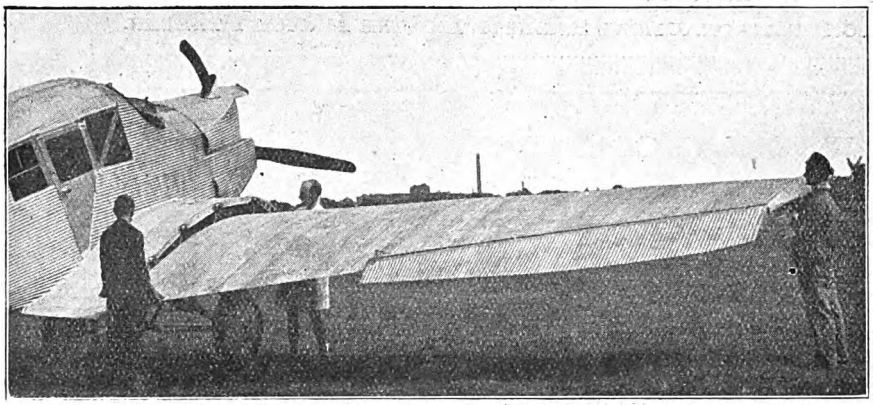
ANOTHER GERMAN VISITOR.

As a sequel to the paper on "The Metal Aeroplane" by Herr Hugo Junkers which has recently been received by the Royal Aeronautical Society, a specimen of a standard Junkers six-seater has been flown from Gelsenkirchen to Croydon for the inspection of members of the R.Ae.S. and of other interested persons.

The general characteristics of this type are already fairly well known—both as to general arrangement and as to detailed construction—which is practically identical with that of the war-type single-seater which was dissected and described in great detail by the Air Ministry during 1919.



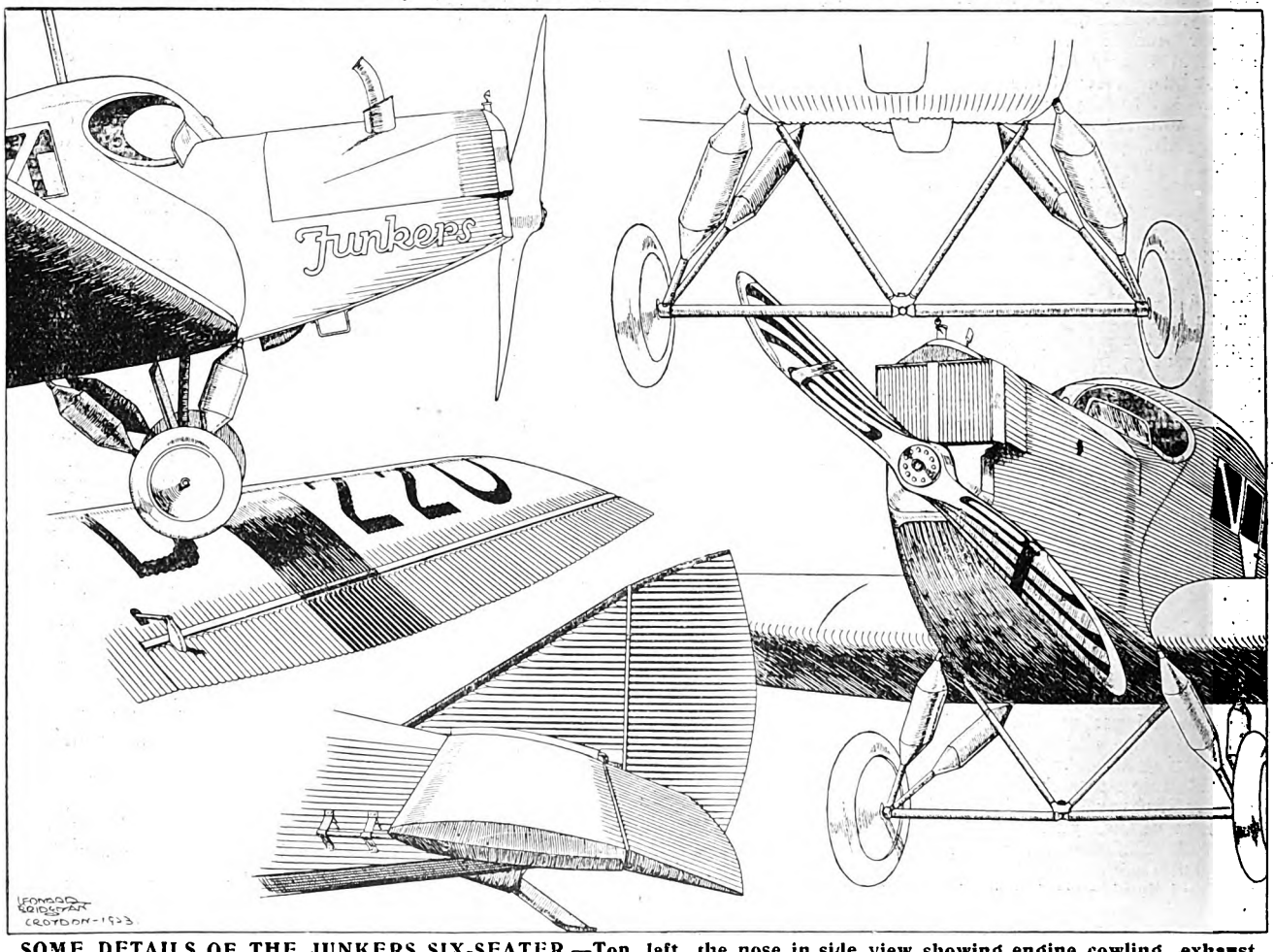
ASSEMBLING A JUNKERS SIX-SEATER. — The photograph shows three men engaged in assembling one wing of a machine of the type seen at Croydon recently. After the two men at the wing roots have engaged two of the right and left handed nuts which join up the tube wing spars to the corresponding wing root spars, one of them climbs onto the top of the wing root and tightens up all the upper nuts, and the other goes below and screws up the lower nuts. The process takes only a few minutes.

There is a very striking contrast between the constructional methods used in the Dornier machine which has just left Croydon and this more recent German visitor. Whereas the Dornier design seems to have been based mainly on a desire to produce a machine which can be built with the least possible equipment of special tools, and at a very low labour cost, the Junkers machine could obviously not be built at all without a very special equipment of jigs and tools. It should be relatively cheap to manufacture in quantities, but it must have been a costly type to initiate—though in this respect the British type of steel construction is probably more expensive still.

The Junkers is entirely built of duralumin, the characteristic feature being the use of thin corrugated sheet metal covering which serves as a vital part of the structure. The wings which are attached to the base of the fuselage are built on nine duralumin tube spars which lie just inside the wing profile. These "spars" are united both transversely and fore and aft by a "Warren" bracing of riveted on duralumin strips. There are no ribs whatever, the corrugated skin is riveted directly to the tube spars and the wing section is maintained between the tubes by the stiffness of the skin—which also serves as the closing member which ties the tube spars together into one structure.

The fuselage is built up on formers of trough section, and has no longitudinal members whatever other than the corrugated covering.

Above the wing the fuselage is sufficiently deep to form a cabin to contain four seats. This depth is maintained a little forward of the cabin proper, over the position of the pilot's cockpit, but the height is suddenly reduced ahead of this



SOME DETAILS OF THE JUNKERS SIX-SEATER.—Top, left, the nose in side view showing engine cowling, exhaust pipe and the pilot's cockpit and the undercarriage. Left, the undercarriage in front view. Left, centre, is shown one aileron with its single operating post at the inner end. Below this is a side view of the tail unit, and in the right bottom corner is a threequarter front view of the nose of the machine.

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cockpit to that of the engine cowl, the engine being relatively low in the fuselage.

The pilot's cockpit contains two seats, both fitted with complete controls. The starboard controls are easily removable if the seat is needed for passenger carrying.

The seats in the cabin consist of two folding bucket seats (also built of corrugated duralumin) forward, and a settee the full width of the cabin aft. The after seats are very comfortable and give ample leg room. The front seats are fair, but would become uncomfortable in a short time for anyone with long legs. An openable cellon window communicates with the pilot's cockpit, and glass side windows can also be opened. There does not appear to be any special provision for ventilation and owing to the low wing there can be little view from the cabin.

The view from the pilot's cockpit—which is really a more important matter—is excellent. The engine is well below the pilot's eye level, and he is far enough forward to see nearly vertically over the leading edge of the wing.

The tail and control surfaces are constructed similarly to the wing. The tail plane is of the "upside down" type—that is with a greater camber below than above.

The ailerons are of great span and narrow chord, and thanks to the stiffness of their construction they can be operated by one king post at their inner ends only. The rudder is cable controlled. Ailerons and elevators are operated by push and pull rods and bell cranks.

A very noticeable feature both of this machine and of the Dornier, is the absence of friction in the control system. This is probably due to the fact that with a metal covered machine there is no tendency for the fabric to pull the lightly built control surfaces out of shape, and consequently all hinges can be accurately and permanently aligned.

The engine fitted is a Junkers built B.M.W. of 185 h.p. As in the case of the Dornier this engine is of the recent low compression type permitted by the Council of Ambassadors, and the performance of the machine suffers in consequence. With full load (pilot and five passengers) the machine is said to cruise at 140 km.h. (87 m.p.h.) with a fuel consumption of 40 litres (9 galls.) of benzol per hour, and to have a top speed of 165 km.h. (102 m.p.h.).

A REMARKABLE SPEED RANGE.

The non-technical Press has already drawn attention to the wonderful performance put up on test recently by the Fairey "Flycatcher" with a Siddeley "Jaguar" 350-h.p. engine. It was there reported that the machine had achieved the extraordinary feat of putting up a top speed of 130 m.p.h. and a slow speed of 36 m.p.h. One has no official information on this subject and it is probable that the figures may not be scientifically accurate if taken from an ordinary air-speed indicator not calibrated on that particular machine.

It is to be presumed that the statement as to the figures was overheard by somebody who was present at the tests and was unaware of the fact that the machine was built for fleet work and that consequently the air-speed indicator was graduated in knots instead of m.p.h. That being so it would appear that the correct top speed would be about 151 m.p.h. and the slow speed about 42 m.p.h.

It will be seen that the machine has an extraordinary high speed for a two-seater fighter and when one considers that it is equipped with all the assorted gadgets which are required for fleet co-operation it is evident that quite a large amount of weight can be saved in a similar machine intended solely for overland work and not for deck-landing.

The enormous speed range shown by this machine and achieved by the use of Fairey Flaps indicates what might be done with commercial aeroplanes if the same system were adopted for big machines. It will be remembered that the Fairey seaplane which flew the first half of the journey across the South Atlantic from Portugal to Brazil demonstrated that it was possible to make a machine capable of carrying 15 passengers from London to Paris at 90 m.p.h. with a Rolls-Royce "Eagle" engine, thanks to the Fairey Flap system. Perhaps some day somebody will have the enterprise to order a commercial aeroplane on this system.

One gathers from eyewitnesses that the "Flycatcher" not only shows this extraordinary speed range but also most amazing controllability. Actually the pilot was able to roll the machine from side to side on almost vertical banks when descending like a parachute at a speed far below the stalling speed of the machine and that when absolutely stalled instead of putting its nose right down and diving or getting into a spin the machine took up a straight glide as soon as the nose was allowed to drop a little.

Altogether we seem to have in this machine a very considerable advance on anything which has been produced hitherto and it certainly brings us several stages nearer the day when Civil Aviation will become a commercial proposition thanks to aeroplanes which can not only fly fast but can also fly slowly when visibility is bad and can be put on the ground at practically a standstill.—C. G. G.

THE AERIAL SURVEY CO. (NEWFOUNDLAND) LTD.

Owing to Mr. Alan Butler's interests on this side of the Atlantic necessitating his constant attention he has found it necessary to resign his position as Chairman of the Aerial Survey Company (Newfoundland) Ltd. and its associate company, The Hawkes Bay Trading Company Ltd. Mr. Sidney Cotton is now the Chairman and Managing Director of the two companies, and Mr. Butler is a large shareholder.

Aircraft operations in Newfoundland were started by Mr. Cotton in 1920 and as the result of flying about and seeing timber limits from the air he acquired certain limits and his company has now already sent two shiploads of pit-props to this country. At the end of two years' work, which was made possible by Mr. Butler's financial support, a fleet of six machines was acquired, and also considerable experience and goodwill in the pit-prop business. Mr. Butler has just returned from Newfoundland, where he has been attending to the incorporation of the two companies which are continuing the business under Mr. Cotton's guidance.

The Hawkes Bay Trading Company is now a growing concern, doing good business, and the aircraft concern hopes to get winter mail contracts for carrying mails and passengers by air for the Newfoundland Government. For this purpose they will use Martinsyde and Westland machines. The owners of sealing fleets are also going to employ aircraft this winter to assist in finding the herds of seals.

The Aerial Survey Company is now keenly looking forward to the Spring as it owns a large number of claims in some new goldfields that have been discovered in Labrador. The company and those associated with it were able to secure the claims almost immediately after the original taker had filed his claim at the Office of Mines. Since then much interest has been shown by the general public and all claims have been taken up. The whole thing is, of course, entirely a gamble as it is not known whether the gold is there in commercial quantities, but one thing that seems fairly certain is that there will be a rush by prospectors when navigation opens next Summer.

In the meantime the only people who can get there are the Aerial Survey Company with their aircraft, and they propose to do this as soon as conditions become right. Mr. Butler has bought a two-masted schooner which he is fitting up with an auxiliary motor, and he proposes to go to Labrador when navigation opens on a short pleasure and business trip combined. He will have in his party an expert geologist, and also suitable equipment to carry out a thorough examination of the area. Capt. Sidney Bennett, late R.A.F., and a Director of the Aerial Survey and the pit-prop companies, will also accompany him.

Mr. Butler owns some 80,000 acres of claims and the company in which he is also a shareholder and director owns 19,200 acres of selected claims which have been pooled by friends. This company will be called The Labrador Gold Deposits Ltd., the Chairman being the Hon. J. R. Bennett, late Minister of Militia, Newfoundland, and the other directors will be Mr. Alderdyce, an influential local business man, Mr. Cotton, Capt. Bennett and Major Hemming. The latter has just returned to this country in order to work in co-operation with Mr. Butler on matters connected with civil aviation. The claims have simply been taken up by way of a sporting gamble and the owners are quite prepared to find them worthless in the Summer, but if on the other hand they turn out well they are in a position to work them.

VICKERS PROGRESS.

There is still much interesting activity at the Vickers works, but some of it is so interesting that it cannot or must not be described—such is the desire of the Air Ministry.

The "Vixen" (Napier "Lion"), a machine intended for reconnaissance, photography, etc., with a little fighting thrown in, is now ready for her first flight, and by the time these notes appear will probably have flown. Great things are expected of her, including a top speed of 160 m.p.h. or more, a good rate of climb, and useful lifting power.

Two "Viking IV's" were tested recently before the Dutch Government's Inspector, who passed them for service with great satisfaction, and they have since been packed for shipment to the Dutch East Indies. With regard to the "Vikings" being used by the Dutch in Java, Vickers Ltd. have received a very satisfactory report, which states that the machines are resisting very well the trying climate.

At Martlesham Heath the first machines of the "Virginia" and "Victoria" types have been very successful in their tests, and a second "Victoria" is being delivered to the Air Ministry.

A number of "Vikings" for stock are being constructed, and some old "Vimys" are being reconditioned, and altogether the shops are quite busy. Some experimental work with metal wings is being carried out, but there is not yet much in this connection to report. The designing and drawing offices are engaged upon some new designs for the Air Ministry.—J. F. S.

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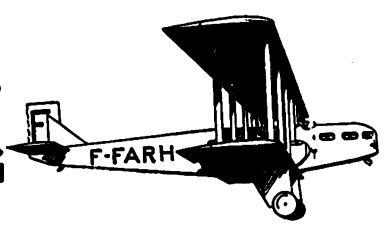

C.M.A. Air Lines is the British title of the Compagnie des Messageries Aériennes, whose head office is at 2, Rue Galilee, Paris. The Company was originally founded early in 1919, by M. Louis Breguet, for the transport of goods from Paris to Lille, the ground communications having been so much disturbed by the European War This line, which was the first commercial aviation service in the world, was soon extended to Brussels and the line from Paris to Brussels has been maintained by the Company ever since.

In September, 1919, a service between London and Paris was inaugurated in conjunction with Handley Page Transport, Ltd. This was originally operated three times a week each way, but later, when the two Companies separated, a daily service was commenced, which has now been extended to a thrice daily service. Générale By an arrangement with the Compagnie Transatlantique a service is run to connect with the arrival and departure of this Company's sailings between Le Havre and New York. This is the first occasion on which a large shipping company has recognised the necessity of using commercial aviation in its transport policy.

The Company's service has now reduced the time of transit between London and Paris to two and a-half hours; between London and Le Touquet to one and a-quarter hours; between Paris and Brussels to two hours; between Paris and Amsterdam to two hours and a-quarter hours; between Brussels and Amsterdam to one hours and between Brussels and Lyons and connecting A line has been inaugurated to run direct from London to Marseilles, calling at Paris and Lyons and the East. This with the Steamship Lines to India and the Egypt. brings Marseilles within eight hours' reach of London and Lyons within six and a-half hours.

The C.M.A. Passenger Service is maintained by twin tractor Farman Goliath Biplanes, fitted with two 300-h.p. Renault Engines and with a seating capacity for 12 passengers, pilot and mechanic. This machine has a wing-span of 92 ft., a length of 49 ft. 6 in. and a height of 16 ft. Its cruising speed is 93 m.p.h. The freight, mail and newspaper services utilise the smaller type of single-engined Spad and Breguet.

The Compagnie des Messageries Aériennes is an association of aircraft constructors for the study and application of Aerial Transport, and among its Board of Directors appear the well-known names of Messrs. Blériot, Breguet, Caudron, Farman, Morane, Luquet de St. Germain and Renault.—*Extract from R.Ae.C. Year Book.*

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AN OFFICIAL VISIT.

It is of interest to note that on January 15th Sir Samuel Hoare, Bart., C.M.G., M.P., Secretary of State for Air, paid an official visit to the Factory of the Supermarine Aviation Works Ltd. Mr. Hubert Scott Paine, Managing Director of the firm, and his Staff received the Secretary of State and showed him a number of their latest products now in construction for the Air Ministry and for Civil Aviation and for various foreign nations. This was the first time that the Secretary of State had visited an establishment exclusively engaged in the design and construction of seagoing aircraft and it was also the first occasion on which a Secretary of State for Air had visited the Supermarine Works.

Those who believe that the future of the British Aircraft Industry like the future of most British industries lies in foreign trade will find considerable justification for their belief in the amount of business which is being done overseas by the Supermarine Aviation Works Limited. The accompanying illustration shows a new Supermarine Channel Type Mark II. Naval School and Training flying-boat 240 h.p. Siddeley "Puma" engine which has recently been supplied to the Chilean Government.

This is a type of machine which has been developed from the well-known "Channel" type flying-boat which was produced shortly after the war for commercial purposes. The hull and forward step of the boat have been re-designed and a great improvement is found in many respects especially when taxi-ing on water. Photographs show how clean is the hull under these conditions. These boats are fitted with dual control, the latest and most up-to-date wireless telegraphy and telephone sets and also bomb-dropping gear for practice with dummy bombs. Also it will be noticed that a machine-gun is fitted in the forward cockpit so that the boat can be used for gunnery training.

The trials which were recently carried out before representatives of the Chilean Legation were highly satisfactory in every respect and undoubtedly on their arrival in Chile the Supermarine product will be used under the best conditions seeing that Lieut.-Col. J. L. Travers, one of the earliest of R.N.A.S. officers, is in charge of Naval Aviation.

It is noteworthy that this type of boat, though in some cases with smaller engines, has been used in the Naval Training Schools of various foreign Governments including the Imperial Japanese Navy, the Royal Norwegian Navy and the Royal Swedish Navy. It is in Naval aircraft particularly that the British Aircraft Industry has so great a lead over all other nations and it is natural that just as the personnel of foreign navies were trained in the past on British-built ships so now the personnel of foreign naval Air Services should be receiving their training on British-built aircraft.

WANTED: AN R.E.8.

A Canadian ex-officer of the Royal Air Force who served in 34 Squadron is very anxious to obtain one or two photographs of R.E.8 machines, the type on which he did most of his flying. Will some kind-hearted reader of THE AEROPLANE oblige him with a print of an R.E.8 in memory of the late lamented war? Possibly some firm that made R.E.8s. may have a spare copy of a photograph which they would like to send, by way of advertising their existence to Canada. Any such photographs should be sent to this office addressed "P. M. H., c/o THE AEROPLANE."

THE INSTITUTE OF AERONAUTICAL ENGINEERS.

No. 3 of the Minutes of Proceedings of the Institute of Aeronautical Engineers which has just been issued contains the full report of the paper on "Aeroplane Design" by Mr. H. P. Folland, and of the subsequent discussion.

This paper which is fully illustrated is of a most valuable nature. It deals with the practical aspects of aeroplane design in the drawing office in a very illuminative manner. A great deal of attention is given to the design of details—a subject treated very scantily in most of the existing literature on the subject—and Mr. Folland's long and varied experience of design is a sufficient guarantee that his views on practical designing are of the greatest value.

This issue—which comprises 38 pages of text and illustrations—may be obtained by non-members of the Institute from the offices of THE AEROPLANE, price 2s. 6d. post free.

A SATISFACTORY START.

It is of particular interest to note that in the recent highly satisfactory trials of the Avro "Aldershot" with a Napier "Cub" engine of 1,000 h.p. the Bristol Gas Starter formed part of the installation and operated quite satisfactorily in starting the engine. In the claims which have already been published for the Bristol Gas Starter the firm has been extremely modest in stating the size of engine for which the Starter was suitable, in fact it has been assumed by most people that it was designed for the 450 h.p. "Jupiter" and would not be satisfactory for higher powers. Obviously therefore the fact that it was able to start the 1,000 h.p. "Cub" without trouble is considerable testimony to the value and efficiency of the Starter.

BUMBLEDOM AND B.R.S.

The Weybridge Urban District Council received a complaint some weeks ago from residents of the locality with regard to the noise of the B.R.2 engines that have been tested recently at the Lang Propeller Works. In reply to a letter from the Council the managing director of the company (Mr. Gwynne) stated that they did not admit that the testing of aero engines could in any way be described as a nuisance, especially in Weybridge, having regard to "the large aircraft industry" carried on in the district. They had only a small contract for the Air Ministry for the reconditioning of engines, and this would soon be completed. It was impossible to fit any mechanical device for enclosing rotary engines under test.

The Council decided at a recent meeting to inform Lang Propeller Ltd. that they believed the complaint to be justified, the nuisance being very detrimental to the neighbourhood, and that they understood that steps which had not yet been adopted by the company could be taken and would lessen the nuisance considerably.—J. F. S.

THE HAWKER ENGINEERING CO.'S MOVE.

The H. G. Hawker Eng. Co. Ltd. have now taken over the entire Sopwith Works and are vacating the old works, which they have occupied since their inception, next the Cinema in Canbury Park Road. They have fairly substantial Air Ministry orders in hand both for new machines of their own design and for reconditioning.

MORTGAGES, CHARGES & SATISFACTIONS.

CAMDEN ENGINEERING CO. LTD.—Particulars filed of £9,500 debentures authorised Dec. 28th, 1922, charged on the company's undertaking and property, including uncalled capital, the whole amount being now issued.

The Supermarine "Channel" Type Mark II. Naval School and Training Flying Boat (240 h.p. Siddeley "Puma" engine) recently supplied to the Chilean Government.

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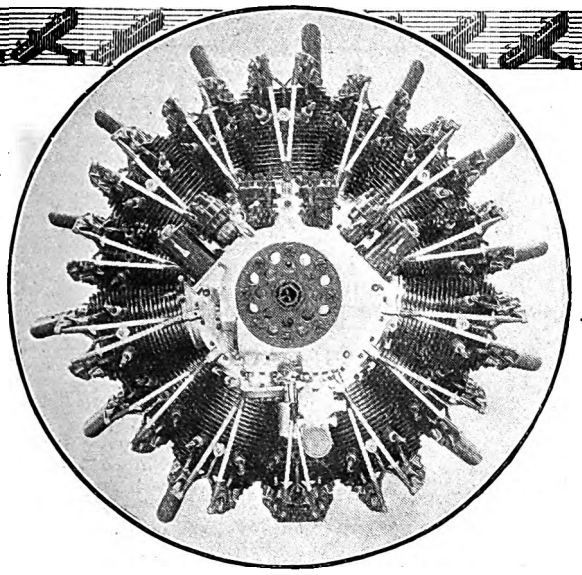

The "JAGUAR."

The "Jaguar" gives 350 h.p. at 1,600 revolutions. It is the most compact and complete unit for its horse power ever produced. Outside diameter is only 43". Low petrol and oil consumption and perfect cooling.

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150 h.p. 7 cyl. Armstrong Siddeley Radial.
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Duration of
1 hour 34 mins. 51⅘ secs.

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Accomplished 230 miles.

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200 Kilometres. 124 miles — 57 mins. 37⅖ secs.

"SEA LION II" SINGLE SEATER AMPHIBIAN.
450 h.p. Napier Lion.
Winner of the International Race for the Schneider Cup at Naples, August, 1922.

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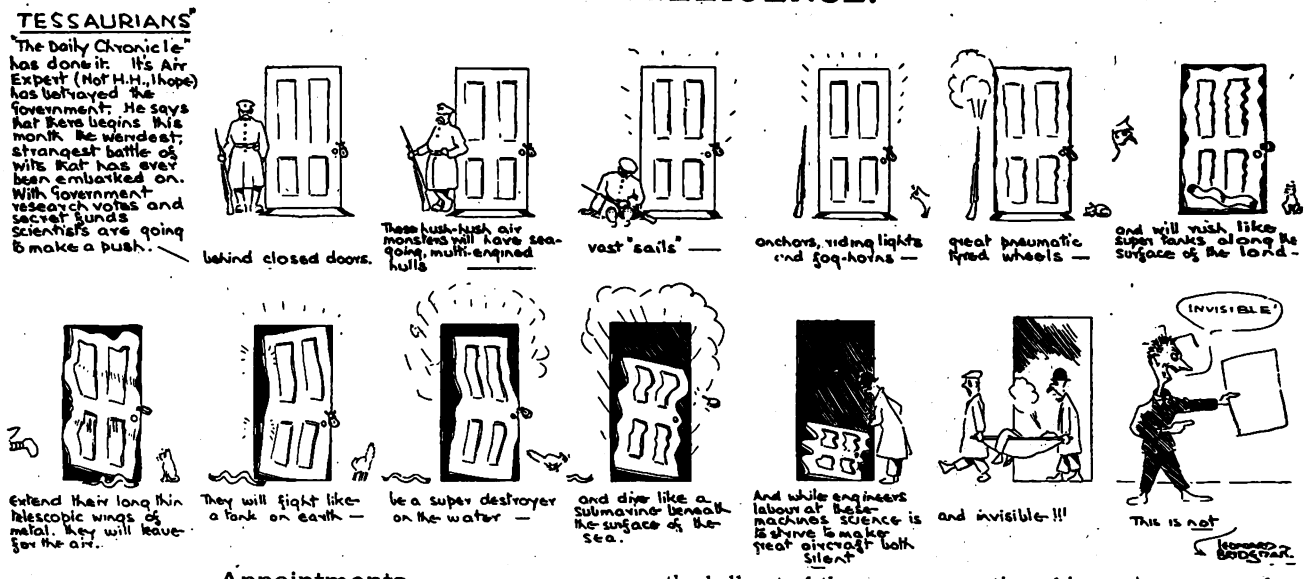
R.A.F. INTELLIGENCE.


TESSAURIANS
"The Daily Chronicle" has done it. It's Air Expert (Not H.H., I hope) has betrayed the Government. He says that there begins this month the weirdest, strangest battle of wits that has ever been embarked on. With Government research votes and secret funds Scientists are going to make a push.
behind closed doors.
These hush-hush air monsters will have sea-going, multi-engined hulls
vast "sails" —
anchors, riding lights and fog-horns —
great pneumatic tyred wheels —
and will rush like super tanks along the surface of the land -
Extend their long thin telescopic wings of metal. They will leave for the air.
They will fight like a tank on earth —
be a super destroyer on the water —
and dive like a submarine beneath the surface of the sea.
And while engineers labour at Beta-machines science is to strive to make great aircraft talk silent
and invisible-!!!
INVISIBLE
This is not
Leonard Brockbank

Appointments.

AIR MINISTRY, Jan. 19th.

GENERAL DUTIES BRANCH.—Wing/Cmdr. F. E. T. Hewlett, D.S.O., O.B.E., from Half-pay List to H.Q., Coastal Area, 10/1.

F/Lts. A. C Randall, D.F.C., from R.A.F. Depot to Inland Area Aircraft Depot, for duty as Adjutant, 6/1; G. H. Reid, D.F.C., from R.A.F. Depot to No. 1 Group H.Q., 12/1; D. Craik, D.F.C. (the notification concerning this officer dated 15/1/23 is hereby cancelled); A. C. Collier, from No. 24 Squadron to Air Ministry (Dept. of C.A.S.) (D.O.I.), 15/1 (the notification concerning this officer dated 20/12/22 is hereby cancelled); R. J. Sanceau, from No. 1 Group H.Q. to Air Ministry (Dept. of A.M.P.), date 1/1 (substituted for the notification dated 20/12/22); D. Gilley, D.F.C., from No. 2 Squadron to R.A.F. Staff College, for duty as Adjutant, 26/1.

MEDICAL BRANCH.—F/Lts. C. Y. Roberts, from Aeroplane Exper. Estab. to H.Q., R.A.F., India (Supernumerary), 6/1; (Hon. S/Ldr.) H. B. B. Greene, from School of Naval Co-operation and Aerial Navigation to Aeroplane Exper. Estab., 12/1; M. J. Cahalane, M.B., from Aeroplane Exper. Estab. to R.A.F. Base, Gosport, 14/1.

STORES LIST.—F/Lt. F. J. Cooke, from R.A.F. Depot to No. 1 School of T.T. (Boys) (Halton), 19/1.

From *The London Gazette*, Jan. 16th.

R.A.F. GENERAL DUTIES BRANCH.—F/O. R. Harrison, D.F.C., is granted a perm. commn. in the rank stated (Oct. 24th, 1919) (since promoted). The notification in *Gazette* of Oct. 24th, 1919, appointing him to a short service commn., is cancelled.

The notifications in the *Gazette* of Dec. 26th, 1922, concerning F/Lts. A. Hunter, O.B.E., and C. P. O. Bartlett, D.S.C., are cancelled.

MEMORANDUM.—F/Lt. F. C. Troup is deprived of permission to retain the rank of Lt. on conviction by the Civil Power (Dec. 18th, 1922).

R.A.F. Rugby in 1923.

Before the R.A.F. can give either of the other Services anything like a game there must be some drastic alterations in the team, judging by the lamentable display by the R.A.F. at Honor Oak Park against Guy's Hospital on January 10th. To begin with it is suggested that the Skipper makes up his mind whether the Air Force team or the Cambridge team is of greater importance. One would have imagined that to an officer holding a permanent commission such a question could not possibly arise, and it seems perfectly obvious that no man can efficiently skipper two teams.

Furthermore the fact that F/Lt. Lowe who is an International player has not turned out for the R.A.F. in these lesser matches is bound to give rise to the idea that he is nursing himself for International matches. And if all members of the R.A.F. team do not habitually play together the team cannot be a team.

The admirable action of the Navy on a certain historical occasion when a famous player was fetched home from a foreign station in a destroyer to play for the Service cannot unfortunately be repeated by the R.A.F. but there must be plenty of material in this country capable of putting up a good show even against a first-class side like Guy's

To return to the match against Guy's. Outside the scrum, S/Ldr. Russell at scrum-half played a great game. Getting the ball out of the scrum every time, his passing was perfect. The stand-off half sometimes dropped the ball, sometimes never saw it and frequently waited for one of the opposing team to take it out of his hands. He atoned somewhat in the last half hour of the game, by which time Guy's were 18 points up.

Mr. "Taffy" Jones, in spite of his slight tendency at times to introduce K.B. reconnaissance methods on the Rugger field would undoubtedly have done a good deal to save this and something should be done, without delay, to lure him back from playing for Richmond instead of the Air Force for the honour if not the glory of the R.A.F.—glory being out of the question with such a team as that which at present misrepresents the R.A.F.

F/Lt. Riddle, by far the best of the three-quarters, was completely starved on the left wing. He got one pass, about six inches high, in the whole course of the game. He did noble work in defence and his great speed and deadly tackle undoubtedly saved the Air Force line from being crossed a further four or five times.

The full back occasionally found touch with a good long kick but mostly he appeared flustered and uncertain, it looked rather as if he were suffering from "stage fright," and his fielding was indescribably bad.—C. M. MCA.

PERSONAL NOTICE,

DEATH.

SALMOND.—On Jan. 20th, at Whaddon House, Bruton, Lady Salmond, wife of Major-General Sir William Salmond, K.C.B., and mother of Air Vice-Marshals Sir Geoffrey and Sir John Salmond. R.A.F.

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Jan. 21st:—

LONDON—PARIS:

Handley Page Transport, Ltd., machines 6*, passengers 29. Air Union, machines 6†, passengers 20. Total machines 12, passengers 49.

LONDON—OSTENDE—COLOGNE:

Instone Air Line, Ltd., machines 8*, passengers 19.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 7, passengers, Manchester-London, 6, London-Amsterdam, 6.

LONDON—ROTTERDAM:

K.L.M., machines 8, passengers 9.

SPECIAL MACHINES. LONDON—BERLIN:

Junkers, machine 1, passengers 0.

Total number of trips by British machines: 21, carrying 50 pas.

Total number of trips by foreign machines: 15, carrying 29 pas.

Trips per day.—Monday, 13; Tuesday, 11; Wednesday, 3; Thursday, 0; Friday, 0; Saturday, 9; Sunday, 0.

STATISTICS.

Machines, 36; Passengers, 79; Crews, 63; Total Personnel, 142.

Corresponding week last year:—

Machines, 14; Passengers, 14; Crews, 21; Total Personnel, 35.

Corresponding week, 1921:—

Machines, 15; Passengers, 12; Crews, 17; Total Personnel, 29.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air-Union = G.E.A. + C.M.A.)

Croydon Notes.

A RACING FIGHTER.

The Aircraft Disposal Company have been busy this week with the D.H.9a (Rolls-Royce) with the two Lamblin radiators. Mr. Piercey was out on it on Sunday, 14th, and again on Monday. It has a fine turn of speed.

On Monday of last week Mr. Perry was testing an ordinary D.H.9. On Tuesday he had an Avro out and on Thursday he was up on the D.H.9 again.

On Friday Capt. Rex Stocken was testing another D.H.9.

AU REVOIR.

Herr Frantz left Croydon on Tuesday on the Junkers monoplane for Berlin and reached Rotterdam in 3 hours 8 minutes. It is to be hoped that these interesting machines will soon be regular arrivals at the aerodrome when the line to Berlin is in working order next month. One gathers that the Daimler Airway has had a very large number of applications from would-be passengers to Berlin.

OUT-HERODING HEROD.

A good story is being told at the aerodrome. In the days when there were three British air lines to Paris a member who shall be called "A" of what one will call the X air line travelled from Paris to London on a machine belonging to what may be called the Z air line. In due course an official of the X line wrote to the Z line and asked whether they would be good enough to refund the money paid for A's passage as they (the X line) always carried officials of the Z line free when possible.

The Z line replied that as they always had been pleased to carry officials of the X line free of charge, they had naturally not charged on this occasion and so there was nothing to refund.

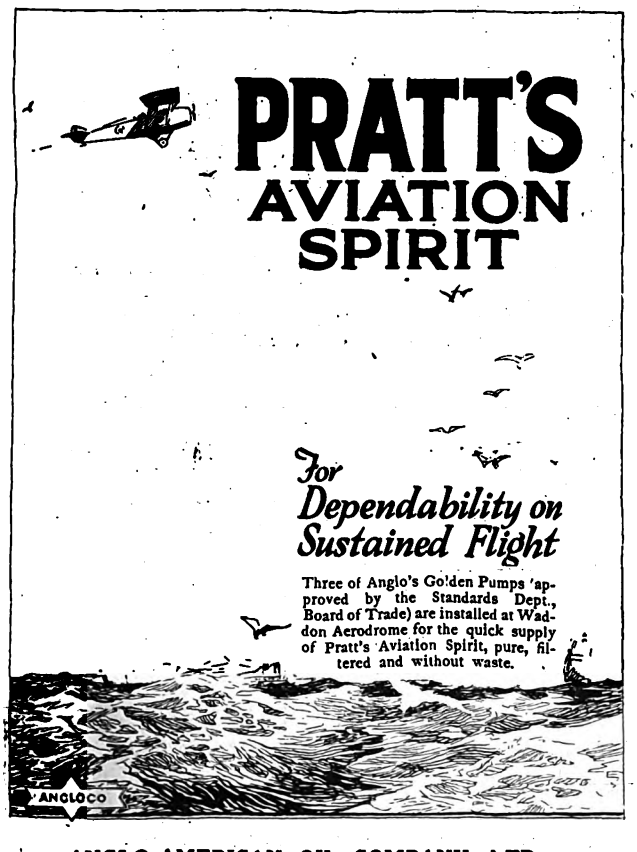
The X line duly regretted their error but pointed out that this arose through "A" having charged his firm six guineas for the flight in his expenses sheet. Whether this six guineas was for wear and tear or whether "A" is practising to run an air line himself one day is not quite clear.

BAD LUCK.

Mr. Geysendorfer, one of the best of the many good Dutch pilots, had bad luck on Saturday. Coming into Croydon on one of the new Fokkers with the raised wing and an "Eagle IX." engine he met a gust just as his wheels touched. The machine with its super-efficient wing gave a jump, tilted to the right, got the wind under its left wing, cart-wheeled neatly over the right wing-tip by numbers. "Aileron—Prop—Bus" said an onlooking official as the three consecutive bumps occurred and one of the named members went bang at each. Mr. Spry Leverton lived right up to his name as he leapt for the ambulance, but fortunately nobody was hurt. The two inside passengers bumped their heads and Mr. Geysendorfer was quite unnecessarily angry with himself, for it was certainly no fault of his.

IMPENETRABLE GLOOM.

No machines came in or out of Croydon on Wednesday or Thursday. On Wednesday a Handley Page left Paris and a Fokker left Rotterdam but both machines had to land at Lympne owing to fog. Among the three passengers in the Fokker were Mr. Claude Hunt-Winter of D. Napier and Son Ltd. who had been to Holland to conclude some important negotiations about Napier "Lion" engines. Mr. Winter was a pilot in the R.A.F. during the War but this is his first venture into the atmosphere for some years at any rate so far as commercial machines are concerned. He was evidently treated with great hospitality in the usual Dutch manner.—G. D.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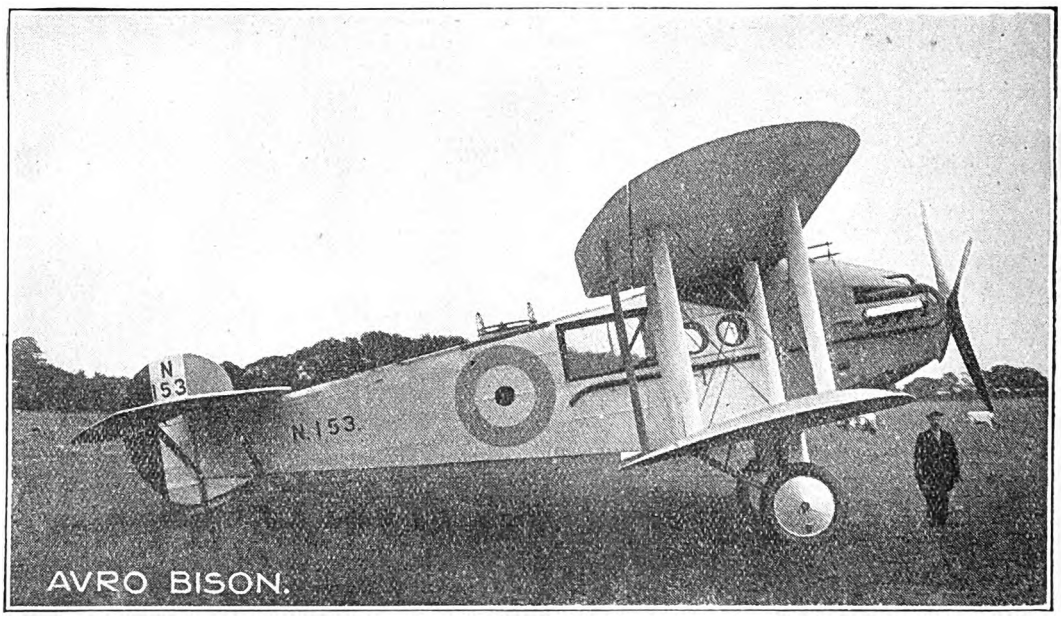

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JAN. 31. 1923.

THE AEROPLANE

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ON TWO BOOKS.—I.

Of the many books which have been published in the past twelve months, good, bad and indifferent, but mostly bad, there are two which ought to be read by every officer of the R.A.F. and by every intelligent person who is concerned for the future of the British Empire. Both books have been written by former officers of the R.F.C. Neither seems to have been written with a set purpose. The writers appear to have written just because they had to write. The spirit moved them and they wrote.

A debt of gratitude is due to their respective spirits, for each book is of an entirely different kind, as different in style, in subject, in manner and in outlook as two books can well be, and yet when one reaches the end of each one lays it down in sorrow that there is not more and more of it to come. One wants to write at once to each author and ask him for more information on this, that or the other incident, or to ask him what became of this, that or the other of the quaint, grotesque or heroic characters which appear in his pages. And each book leaves one, quite unintentionally, with a feeling of thankfulness that one belongs to this humorous, stupid, sane, and undefeatable Anglo-Saxon plus Norman race which alone is capable of producing the men who wrote and the people who as fighting men or teachers made possible the writing of such books.

In each one finds quite clearly, though never once stated, the writer's firm conviction that despite all our faults we British are the chosen of the Lord, so to speak, and that besides us the only people who count are the Teutonic peoples who like ourselves belong to the great Nordic race. And each, the one quite unintentionally and the other with firm intent, demonstrates clearly that the only danger to the Nordic race is the Mongol and his advance guard the Slav. Also the writers have in common a boundless sense of humour which though it varies in its expression makes each book of its kind a pure joy.

The authors are Major the Honourable Maurice Baring, late R.F.C., and Major L. V. S. Blacker, late R.F.C. and still of Queen Victoria's Own Corps of Guides. Never were two men so dissimilar in superficial characteristics and so alike in essentials. Baring the professional artist and author, kindly philosopher and diplomat is as different as can be from Blacker the professional soldier, inborn fighting man, and truculent leader of border brigands. Yet each has made a hobby of war and has seen more of it than any but a few of our military chiefs and each has acquired an extraordinary knowledge of the Mongol-Slav peoples from entirely different points of view, which knowledge has now been put into print for the enlightenment of those who will in due course have to fight the Slavs.

The Puppet Show.

As the senior man Maurice Baring's book* must be considered first. There can be but few people in that major portion of the R.A.F. which served in France who do not know Baring. Presumably everybody in the R.A.F. who possesses any intelligence has read with joy, marked in the best spots, learned much from, and inwardly digested with mental profit Baring's previous book "R.F.C. H.Q."—the most illuminating thing that has ever been published or is ever likely to be published about the War in the Air on the French Front. A reverentially irreverent officer of the R.A.F. has said that the R.F.C.'s creed began "There is no Boom but Boom and Maurice is his Prophet." Well, "The Puppet Show" is the history of that prophet in the making.

The book purports to be an autobiography in that it records Maurice's own experiences, observations, sensations and so forth. Actually it is, as he calls it, a "Puppet Show," but it is a show of European History in general and of London and Paris Society in particular from about the year 1880 up to the beginning of the War in 1914. For Maurice, as the son of Lord Revelstoke, went everywhere, met everybody and saw everything that mattered.

[*The Puppet Show of Memory.—Maurice Baring. (438 pp. + 19 pp. Index). William Heinemann. Price 21/- net.]

A Liberal Education.

Just how the earlier part of the book may strike the younger generation one cannot be sure, but personally it has given one exquisite pleasure. Being within a very little of his age and having almost exactly the same tastes and failings—even to an abysmal inability to learn mathematics and an affection for all things included in what are known, and by the ultra-modern despised, as the Classics—one lived again the days of one's youth when reading the first couple of hundred pages of the book.

Yet, even if that ancient history may not be very entertaining to the young R.A.F. officer it will be well worth his while to read it. If he has any literary taste he will enjoy it for its style and its quiet humour. Also he will acquire a knowledge of people and places and manners and customs which will be very useful to him when in due course the R.A.F. is accepted as being socially on a level with the Army and he is asked to places where he will meet people who lived in those days and know those mentioned in the book.

Owing to the War and the subsequent general upheaval the social education of the young R.A.F. officer has necessarily been somewhat neglected. And, to put it brutally, there are a good many R.A.F. officers who but for the War and the creation of the R.A.F. would never have found themselves in the position in Society which they are now called upon to occupy. All such who desire that the R.A.F. shall not appear at a disadvantage in comparison with the Senior Services will find much of educative value in the earlier portions of the book.

It is not that there is the very faintest hint of snobbishness in Paring's writing. Nobody has ever had less of the snob about him. But it is desirable, for example, when a young officer who has distinguished himself in the War is asked to one of the big country houses near his station that if he himself may have been "educated privately" he should know something of Eton and its ways in case the conversation turns in that direction; and that if his ideals on the stage should be Mr. Owen Nares, Mme. Delysia and Miss Gladys Cooper, he should know of the existence and of the importance in a previous generation of Irving, Eleanora Duse and Sarah Bernhardt, and that if his ideals in literature are Mr. Hutchinson and Mr. Wodehouse and Mr. Leacock he should know that such writers as George Moore, Anatole France, and Swinburne were once considered worth reading.

Early Memories.

Such knowledge is to be gathered in its most entertaining form from Baring's book which is a liberal education in itself. It will at any rate prevent the young reader from feeling out of it altogether when the older people begin talking. Not only does Maurice tell of these stars of past days but he tells so many illuminating and frequently deliriously funny stories about them that one feels that even if one knew of them before one now knows them, which is quite a different thing. For the great thing about his puppet show is that all his puppets are alive and nowhere can one see the wires working.

If this paper were as affluent as one could wish one would fill pages with Maurice's quaint phrases and good stories. As it is one cannot select passages, one can only take a few points at random. For example there was the tutor at Eton who said to a remarkably untidy boy "You're covered with garbage from head to foot." And the other who remarked apropos some Latin verse:—"*Castus et infelix* is hardly an appropriate epithet for Charles II." And the story of the mathematical master who was ragged by the ingenious scheme of getting a musician to play "God Save the Queen" on a cornet outside his window at intervals of a few minutes so that the whole division stood up and ceased work intermittently throughout the morning. And J. K. Stephen's "Song of the Scug." And dozens of other good things.

The Good Side of Germany.

A particularly informative and interesting part of the book is that dealing with Maurice's sojourn in Germany what time

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he was endeavouring earnestly to pass for the Diplomtic Service despite his inability to see more than three figures in a row wthout getting a temperature. Therein one learns much of the best side of the German character; the homeliness, the sound good sense, the family affection. One comes to love the Herr Doktor Timme and Onkel Adolph and Tante Emile and the rest.

It helps one to understand the inherent solidity which enabled Germany, with her inept Allies, to stand off for four years the attacks of the twenty-six, or perhaps only twenty-two, enemy nations and then make peace without being invaded. Also it gives one unlimited faith in Germany's ability to recuperate as soon as the International Jew financiers have finished monkeying with the mark. And it creates a great belief in the loyalty and determination of those with whom we shall one day fight side by side against the Yellow Races.

One realises from Baring's simple and sympathetic description how much more the true German is like the solid and stolid Englishmen than either is like the people of any other nation. The description of the German students' *Kneipe*, or beer-drinking competitions are delightful. And his comparisons of German theatrical art with that of England and France are very enlightening.

Altogether this section of the book will be far more helpful than will be the mass of propagandist literature with which we shall be flooded when it becomes necessary to persuade the British Public that Germany is our natural and indissoluble Ally in the next war.

(To be continued.)

LORD RAWLINSON'S EXCUSES.

The *Times* correspondent telegraphing from Delhi on Jan. 24th stated that the Council of State reassembled on that date. Among the questions was one by Mr. Lalubhai Samaldas drawing attention to the administration of the Air Force in India.

The *Times* says :—

"Lord Rawlinson, in reply, declared that the tactical disposition of Air Force formations employed in the occupation of Waziristan was considered by the Government, with his concurrence, necessary. The officers in command of the Wazir Force never reported that the bombs were inefficient to the extent reported in the *Times*, although the failure of bombs to explode could not be entirely prevented. On the main criticism in the articles, Lord Rawlinson said that during the year 1921-1922 there was a considerable shortage of spare parts and equipment for the maintenance of the Force. This was met for a time by the consumption of reserves which, in certain categories, were in the course of the year exhausted. The effect was to diminish the number of serviceable machines.

"On the other hand, no machine was flown which was known to be unserviceable. When the facts came fully to the knowledge of the Government steps were immediately taken to set matters right. The restoration of the efficiency of the Force was in progress and would shortly be completed. This result was being achieved by the allotment of additional funds and the introduction of improvements in the internal administration of the Stores Branch of the Force."

Thereafter the *Times* takes credit for the effect of newspaper agitation in "bringing the authorities to a sense of their responsibilities." Unfortunately it omits to mention that the Air Ministry itself began agitating for reforms as early as December 1919 and that the necessary reforms were well on the road to completion before any newspaper agitation began.

TO R.A.F. INVALIDS.

A former officer of the R.A.F. has placed in one's hands a sum of money which he wishes to be devoted to the relief of crashed, wounded or invalided R.A.F. officers who are in difficulties. His wish is that it should be applied to the help of ex-R.A.F. officers who find themselves in need of financial relief owing to the effects of active service. For example if an ex-officer has the chance of getting a job in civil life but before taking it up needs a small operation or a course of treatment or a brief rest cure in order to fit himself to do good work, then some of this money can be used to help him.

Any readers of this paper who know of thoroughly deserving cases of such a nature are invited to communicate by letter with C. G. Grey at this office. This paragraph has already appeared once in THE AEROPLANE but has not apparently caught the eye of anybody in need of help. All readers are earnestly asked to help any needy friends who are in want through no fault of their own by drawing their attention to this offer.

THE END OF THE DEUTSCH CUP.

The Aero Club de France announce that the Deutsch Cup, having been won twice by the Nieuport Company, has been finally awarded to that company in accordance with the rules. This contest is now closed.

THE PASTIMES OF THE GREAT.

According to the *Morning Post* speaking at a dinner organised by the Herts Philatelic Society at Pagani's Restaurant, Maj.-Gen. Sir Sefton Brancker, Director-General of Civil Aviation, said that the French were subsidising air transport against us. As they were paying such a high subsidy it was completely ruining progress in air transport because they had taken away all incentive to run it economically. Our air transport was three times more economical than the French for that simple reason. Ours was cut down to the bone, and we were trying to get more and more work out of our aircraft and our pilots.

THE REVIEW OF THE YEAR *(Compiled by M. H. & G. D.)*

JULY, 1922.

SERVICE AERONAUTICS.—On July 6th the Parliamentary Secretary for the Admiralty told Viscount Curzon that two aircraft carrier ships were in commission, three were under construction or reconstruction, and one in reserve, and that 17 battleships, 4 battle cruisers and 7 light cruisers were fitted with flying platforms and that the number of pilots and observers was adequate for the aircraft actually allocated to the Navy.

In THE AEROPLANE of July 12th appeared the regulations made by the Secretary of State for Air under the powers conferred by a recent Act of Parliament concerning the investigation of aircraft accidents.

On July 13th in the House of Commons Mr. Churchill answered questions about the aeroplanes sold to the Irish Free State. In the debate on the Navy Estimates Viscount Curzon and others attacked the Air Ministry with the idea of recreating the R.N A S.

In the House of Commons on July 25th Capt. Guest in reply to Lieut.-Comdr. Kenworthy gave certain figures regarding the total personnel of the R.A.F. He explained the short service system, commissions in which are followed by a course in the Reserve and said that the Reserve was intended to provide for the requirements of the R.A.F. at a time of national emergency.

Replying to Sir H. Brittain Capt. Guest said that the possibility of giving further orders to the Aircraft Industry beyond those already budgeted depended upon the decision of the Committee of Imperal Defence. In reply to Mr. Malone Captain Guest said that the constitution of the Auxiliary Air Force would be similar to that of the Territorial Army except in regard to service, training and material. It was uncertain when the Bill for the Auxiliary Air Force would be proceeded with as the whole question of home defence was under consideration by the Committee of Imperial Defence.

[Still nothing further has been made known on the subject.]

CIVIL AVIATION.—In THE AEROPLANE of July 5th it was recorded that the Bristol "Jupiter" engine had passed the French type tests.

At the annual general meeting of Handley Page Ltd. a distinctly reassuring exposition of the company's finances was made.

On July 12th it was announced that the Siddeley "Jaguar" engine had officially passed the Air Ministry type tests.

The Air Taxi Department of the De Havilland Aircraft Company started to run a regular newspaper air service between Lympne and Ostende.

It was announced that His Majesty had been graciously pleased to present a cup for a 1,000 mile race round Great Britain which would start from Croydon Aerodrome on Sept. 8th.

The first announcement to the effect that William Beardmore & Co. Ltd. were producing a semi-Diesel aero-engine to develop 700 h.p. which would burn crude oil was made in THE AEROPLANE of July 19th.

On July 31st the first meeting of the Committee of Imperial Defence was held with Mr. Lloyd George as President to consider the requirements of the R.A.F. and the representations made by the Admiralty and the War Office as to the air Units attached to the Navy and Army.

On July 31st the Air Ministry announced that the Air Council had been reconstituted and the names of the members of the new Council were published.

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Aeronautics Overseas.—On July 4th Freiherr Lothar von Richthofen brother of the famous Rittmeister von Richthofen was killed in an aeroplane accident at Hamburg.

During the first week of July machines from the Aircraft Disposal Company began to be delivered to the Irish Free State.

In The Aeroplane of July 12th the Department of Overseas Trade quoting from a German paper remarked on the record non-stop flight by Herr Stollbrock from Moscow to Berlin, his passengers being the Russian representative Kretinski and his attendants. The distance amounted to 1,800 kilometres. His machine was a Fokker with a Rolls-Royce engine.

On July 11th the International Commission for Air Navigation held its first meeting in Paris.

On July 16th a Spad "Berline" crashed on the Paris-Strasbourg route at Saverne returning from the motor-car "Grand Prix" race and the pilot and four passengers were killed.

In The Aeroplane of July 19th it was noted that the famous French aircraft firm, Blériot Aeronautique, had been reorganised and M. Louis Blériot had been elected President of the Board of Directors.

AUGUST, 1922.

Service Aeronautics.—In The Aeroplane of August 2nd appeared an account of the law action concerning Messrs. Holt and Co.'s claim against Lieut.-Colonel Law Markham for the recovery of overpaid gratuity. Messrs. Holt were heavily defeated and the minds of a number of former officers of the R.A.F. were greatly relieved in consequence.

In the House of Commons on August 3rd the Prime Minister stated that the Government as the result of an inquiry by the Committee of Imperial Defence had decided to provide a force of 500 machines for home defence at a cost of £2,000,000 per annum, £900,000 of this amount to be found from economies in the Estimates of the Air Ministry. It was imagined that this was to be an additional two million, but it proved to be only a Lloyd George trick in that the statement meant only that £2,000,000 out of the Estimates were to be earmarked for Home Defence.

The appointment of Major J. P. C. Cooper, O.B.E., M.C., to be Inspector of Accidents at the Air Ministry under the Air Navigation (Investigation of Accidents) Regulations 1922 was also announced during August.

On August 3rd the Public Schools Cadets Corps encamped at Tidworth were treated to a demonstration of some of the uses of aircraft for military co-operation, the arrangements being carried out by Wing-Commander E. L. Gossage, O.C. the School of Army Co-Operation, Old Sarum.

Bombing tests on H.M.S. *Agamemnon* and *Opportune* by large and small bombing aeroplanes at Gosport are described in The Aeroplane of August 9th.

In the House of Commons during August Captain Guest replying to Mr. Baldwin Raper on the matter of Messrs. Holt said that in a limited number of cases over-issues of pay had been granted to officers and that the bankers responsible for this had been trying to recover the amounts from the officers concerned, but he did not think this fact constituted sufficient reason for dispensing with the services of the firm. He added that since April all R.A.F. officers had been given the option of drawing their pay from Agents or Accountant Officers and that very few had decided in favour of the Accountant Officer.

The *Daily Telegraph* of August 21st recorded an interview which Reuter's correspondent had with Sir John Salmond at Simla where the latter was writing his report on the R.A.F. in India. Sir John admitted that for a long time India had been very badly behind the times as regards its air force but that stores and equipment had recently been arriving and within a few months it was expected that there would be about 70 active machines in the country. He thought that 100 active machines with necessary reserves would meet the requirements of India on the Frontier.

The *Morning Post* stated during August that the Seaplane Floating Dock which had been built in Sheerness Dockyard to the order of the Air Ministry had been commissioned and transferred from dockyard hands to the R.A.F., and was to be attached to Grain Air Station.

Civil Aviation.—On Aug. 7th the 6th Aerial Derby took place starting at Croydon Aerodrome. There were nine starters. The race was won by Mr. J. H. James on the Gloucestershire "Bamel" with 450-h.p. Napier "Lion" engine. The handicap race which was run concurrently was won by Mr. Larry Carter on a Bristol monoplane with a 100-h.p. "Lucifer" engine. The winner's speed was 178 miles per hour.

On August 14th Alfred Harmsworth Viscount Northcliffe died.

During the week between the 14th and the 20th Aug. 1,076 people, of whom 734 were paying passengers, crossed the Channel by air. This is the first time that over 1,000 people have crossed in a week.

Handley Page Transport Ltd. created a record for an air line by carrying 260 passengers in one week.

On Aug. 26th Capt. Rex Stocken on a D.H.9 erected by the Aircraft Disposal Company made a record trip from Croydon to Brussels, completing the journey in 1 hr. 15 mins.

Aeronautics Overseas.—In The Aeroplane of August 2nd there appeared an illustrated article on the history and equipment of the Göttingen Laboratory.

August 9th the Rhön Soaring Competition began but owing to bad weather nothing much appears to have been done until August 16th when Herr Märtens made a flight of 18 mins. 45 secs. On August 19th Herr Hentzen a pupil of Herr Märtens made a flight of 2 hrs. 10 secs. and shortly afterwards one of 3 hrs. and some few seconds.

Major H. G. Brackley, D.S.O., D.S.C., who went to Japan with Col. the Master of Sempill made an extremely fine flight with Japanese naval aircraft. Three F.5 boats one piloted by Major Brackley and the other two by Japanese pilots made a tour almost round the main Japanese island on which Tokio and Yokohama are situated, the total distance covered being 2,000 miles, this being accomplished without any trouble except that one airscrew of one boat was damaged while changing moorings when a storm got up one night. Leitner-Watts metal airscrews were used on Major Brackley's boat and gave no trouble whatever.

On August 7th the French Gliding and Soaring Competition was opened at the Puy de Combegrasse, and during the first week nothing of import occurred

It was reported from Belfast on August 17th that previous to an attack on Dundalk by the National forces aeroplanes belonging to the Irish Free State flew over Dundalk warning their inhabitants of the attack.

In The Aeroplane of August 30th a record flight by Mynheer Fokker on a biplane glider with a passenger of 13 mins. was reported.

The formation of the General Air Service Company in America to build and operate Schütte-Lanz airships was reported as quite a serious proposition.

SEPTEMBER, 1922

Service Aeronautics.—In the Air Ministry Gazette of September 1st appears the appointment of Air Commodore T. C. R. Higgins, C.M.G., to be Director of Training and Staff Duties.

In The Aeroplane of September 6th a leading article deals with the recent attack by the Press on the Air Ministry over the state of the R.A.F. in India and it is pointed out that the blame was really due to General Rawlinson and the Government of India.

On September 14th the first troopship to carry R.A.F. personnel and equipment exclusively, the *Braemar Castle* sailed for Basrah with about 1,000 officers and men.

On September 20th a leading article in The Aeroplane dealt with the R.A.F. in Iraq and the reasons for holding our position there.

In The Aeroplane of September 20th is shown Lieut.-Col. Spenser Grey's scheme for an Inter-City Aeroplane Race in which the entrants should be the cities and towns of Great Britain, each building and entering its own machine.

The R.A.F. Club held a Cricket Week at Eastbourne from September 20th to 27th. Unfortunately the weather and consequently the attendance was bad but otherwise the arrangements were carried through satisfactorily.

Aeronautics Overseas.—Photographs of competing gliders in the German Gliding Competition at Wasserkuppe appeared in The Aeroplane of September 6th. Captain Sayers' report on his visit to the Wasserkuppe appeared in The Aeroplane of September 20th and was continued in subsequent issues.

On September 21st at Etampes M. Sadi Lecointe on a Nieuport-Delage "Sesquiplan" set up a new World's Speed Record, beating that set up by Sig. Brack Papa on August 20th at Turin by 5.249 kms.p.h.

On September 30th the Deutsch Cup Race was held at Etampes, the winner being a French pilot, M. Lasne, on a 1920 Nieuport,

Civil Aviation.—The race round Britain for the cup offered by His Majesty the King started at Croydon on Sept. 8th. There were 21 starters. The race was won by Mr. F. L. Barnard on a D.H.4a with a 360-h.p. Rolls-Royce "Eagle VIII" engine. Mr. Raynham was second on a "Tinsyde" and Mr. Alan J. Cobham was third on a D.H.9. Out of the 21 entries it is significant to note that 7 were of de Havilland design and of the 11 which completed the course 6 were of de Havilland design and out of the first 6 home 5 were of de Havilland design. The only commercial machine to complete the course was the Vickers "Vulcan."

In The Aeroplane of Sept. 27th full details were given of the scheme for splitting up of the three air lines, Handley Page Transport being given the monopoly of the London-Paris route, the Instone Air Line the London-Brussels route and the Daimler Airway the London-Manchester-Amsterdam.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The essential features of the paper recently read by Prof. Junkers before the Royal Aeronautical Society together with comments thereon is the subject of a leading article in this issue. It should be noted that this is in no sense an abstract of the paper, but a narrative based on the paper interspersed with reflections thereon.

Prof. Junkers' story is a record of patient hard work and perseverance extending over a very long period of years, and is well worthy of study.

Illustrations of a new Bristol single-seat fighter of very novel design and a general arrangement drawing of the 25-seater Vickers "Vanguard" twin engine machine are given in this issue.

In addition there are illustrations of the very curious Klemperer 2-seater tail-first glider, and one of the "launch" of the Baatz seaplane glider.

A RECORD OF PERSEVERANCE.

The full text of the paper on Metal Aircraft by Prof. Hugo Junkers which was the subject of the meeting of the Royal Aeronautical Society on Jan. 4th is now available.

This paper, although it contains no strikingly new information of a technical nature, and even very little that is new as to the actual productions which bear the author's name, is yet of very considerable interest.

Prof. Junkers in the paper seeks to exhibit his present metal aircraft not as an ultimate product, but rather as steps which he hopes will lead to the realisation of an at present unfulfilled ideal. With very great justice he points out that "when an innovation is to be carried out in technical matters the inventive idea represents but a small portion of the work leading to the final product." This is not perhaps quite universally true. There have undoubtedly been quite a number of marked and important technical advances which needed the correct "brain wave" and very little else.

But it is undoubtedly true that in nearly all engineering problems at any rate a really brilliant "brain wave" leads at first only to new practical difficulties, and only when these have been overcome can the value of the original invention be realised. If it were possible to inculcate in all inventors an appreciation of this fact, there would be fewer inventions but more useful work.

The Organisation of Experiment.

In regard to the problems attending upon the development of so complicated an affair as a new type of aircraft, Prof. Junkers states very emphatically his opinion that the whole work of development must remain under a single technical direction. Research in aerodynamics, into the properties of the materials and their structural form, considerations of manufacturing methods, and even of purely commercial matters such as the possible requirements of the markets require to be controlled with the one end in view.

Prof. Junkers attributes the practical success which he has attained in the production of metal aircraft to the fact that he was able to build up for the purpose a research organisation covering the many subjects which entered into the problem.

The Object of Prof. Junkers' Work.

The motive for Prof. Junkers' work on all-metal machines was not the desire to build all-metal machines as such, so much as to make it possible to produce highly efficient aircraft of large size. The root idea is contained in a patent granted to him as long ago as 1910—covering the construction of an aeroplane in which the whole of the structural parts, the power plant, the crew, useful load, etc., were to be contained within the wings, thus reducing to a minimum the head resistance.

In its completeness this ideal can only be achieved in machines of comparatively large dimensions, and it was specially the development of large economical aeroplanes that the author had in view.

The task which he set himself therefore was the development of a practical form of construction for an aeroplane having wings of a thickness sufficient firstly to contain within themselves all the bracing necessary to their own support. The reasons for believing that metal construction alone would meet the case of the really large aeroplane are well known to all engineers.

Thick *v.* Thin Wings.

Up to the time when this work began only very thin wing sections had been studied. Such tests as had been made—for instance by Eiffel and at Göttingen (and one may add at the N.P.L.) seemed to indicate that only with such wings could really good efficiencies be attained. Prof. Junkers constructed a wind tunnel of his own at Aachen—later one at Dessau—and began investigations on wing forms. From these it appeared to him that it was not the shape of the outer wing surface so much as the camber of the centre line that influenced the performance of an aerofoil, that the actual thickness in itself was not of deciding importance, and that within certain limits thick sections were superior to thin ones.

For maximum speed alone a thin slightly cambered section gives the best results. For low landing speed, quick get off and rapid climb, a thin highly cambered section will give the best results. But a thick section can be found to combine in a very large measure the qualities of the two thin types, and so give a superior allround result. The best results are obtained with a wing having a thickness ratio of 1:7 to 1:5 that is a maximum thickness of 1/7 to 1/5 of the chord.

Incidentally this statement appears to have occasioned considerable surprise to certain British aircraft designers, and Mr. F. M. Green in the discussion inquired pointedly as to the laboratory which was responsible for results so contrary to those with which he was acquainted. It however may be said at once that the statement is very amply confirmed by very numerous tests of thick sections made at Göttingen, and that there is nothing in the familiar N.P.L. test figures which contradict the Göttingen results. British tests compare thin slightly cambered wings with nearly equally thin heavily cambered wings, to the disadvantage of the latter. For instance R.A.F.15 has a maximum thickness of about 1/15 and R.A.F.19 of about 1/10 the chord and R.A.F.19 has nearly twice the centre line camber of R.A.F.15.

The Ideal Metal Wing.

The thick wing having been found to be aerodynamically possible the structural problems of building metal cantilever wings had to be faced. The ideal wing, both from the structural point of view and from that of using it for the stowage of load would be one in which the skin alone served as the structure. If a thin sheet metal skin could be persuaded to devote the whole of its tensile and compressive strength to resisting the primary stresses caused by the air loads then such a wing could be built very much lighter than any wing either of wood or of metal which has yet been produced.

Why it Cannot be Built.

As is well known such a wing would fail to develop anything like its full theoretical resistance to primary stresses, It fails by local buckling under compression, and the problem of overcoming this trouble is the root problem of light metal construction. Prof. Junkers gives a fairly detailed account

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of his experiments on this problem. They need scarcely be related here—particularly as the solution at which he arrived is one already well known in this country. Briefly it is known that a tubular strut will develop its full theoretical resistance to compression provided that the thickness of tube wall is not diminished to below a certain fraction of the diameter. Experiment has shown that this is not a property of tubes only, but that any thin strip subject to strut loading will fail by local buckling unless the strip is curved or corrugated longitudinally to a radius which must bear a definite relation to the thickness of the strip.

This fact was determined by Prof. Junkers and by him applied to his special problem—just as it has been applied by British constructors of metal machines to their special problems. It should be noted that the very wide difference in the constructional details of the Junkers and of any British metal aircraft is due to the widely different type of aircraft to which the two have directed their attention, and not to any divergence of principle in regard to the theory of light metal structures.

THE FIRST STEEL MONOPLANE.

As is well known, the first all-metal Junkers monoplane —the J.1—was built of steel.

The only "steel" available in suitable form was that used for the laminated magnetic circuits of electrical machinery. This was made in sheets 0.1 m.m. thick, of rather small overall sizes—and being manufactured specifically with a view to the possession of certain special magnetic qualities it was by no means all that could be desired from the strength point of view. It could probably scarcely be called steel at all—and Prof. Junkers himself calls it "iron."

The wing of this machine was built of a skin of these plates which had welded to them on the interior a second layer of the same material corrugated. This skin was "propped up" at intervals by ribs, or bulkheads at distances determined by the available widths of metal. The wing was thus made in a series of short bays, and these bays had to be welded together to form the complete wing.

The junction between this wing and the body presented great difficulties. The pilot and engine came in way of the wing, and so the skin—which was the essential member, could not be carried right through. No really satisfactory solution of this problem was ever reached—and Dr. Junkers fails to state how the difficulty was overcome in practice in this particular machine.

This machine was completed and flown by a number of pilots—among them Fokker. The performance on a weight/h.p. basis was excellent but the weight of the machine itself was excessive, and no further steel machines were built.

The type of construction employing the skin as the main member was necessarily in iron, because the weight of skin needed to give local rigidity was practically as great as could be allowed for the whole wing.

DURALUMIN AND SOME OF ITS QUALITIES.

With duralumin, the lower density and greater thickness needed made it possible to construct a light corrugated skin sufficiently stiff to keep its shape under air loads, and to support this skin on a framework of duralumin tubes just inside the cover.

But before using duralumin it was necessary to carry out extensive tests on the material and to develop workshop methods of using it. These investigations covered the effect on the material of heat treatment, its resistance to fatigue, the prevention of corrosion, methods of jointing and so forth.

Prof. Junkers admits serious difficulties were encountered in discovering a treatment which satisfactorily reduced the liability to corrosion, but says that the final result was that duralumin properly treated can be made to satisfy all reasonable requirements. As a matter of fact it seems to be the case that through the work of Dr. Junkers and others it has been possible in Germany to produce duralumin in a state of relative reliability.

The problem of jointing duralumin tube, and of attaching to the tube the covering and the intermediate bracing strips was one of some difficulty. Duralumin can be welded but not without serious damage to its physical qualities. Riveting alone seems to give a satisfactory joint—and Prof. Junkers had to develop a very ingenious tool whereby it was possible to form rivet heads in the interior of small bore tubes in order to construct his special form of wing.

These initial difficulties overcome the actual design of wings and other units was undertaken and the results checked by loading and vibration tests on completed parts.

The unusual disposition of the wing at the bottom of the fuselage used in the majority of Junkers monoplanes has been the subject of considerable criticism. It appears that the real reason for using it was that it allowed the wing root tube structure to be built right across the fuselage—with the pilot sitting above it. Aerodynamically it is admitted to be slightly inferior to the high wing arrangement, but it is claimed that there is less loss of efficiency caused by the airscrew slip stream with the low wing. For the small 60 h.p. two-seater the high wing position has been adopted in order to obtain the small increased efficiency of this wing arrangement.

PROJECTS FOR THE FUTURE.

Projects for the production of real giant aircraft which are still before Prof. Junkers' mind have been retarded by the conditions imposed on Germany since the Armistice. A large aeroplane of 750 h.p.—as a step towards the giant type—was started after the Armistice, and parts of it have been built, but work was stopped in 1921. It is very evident however that there is little doubt in Prof. Junkers' mind that it is perfectly possible to build metal cantilever monoplanes of very much greater size than anything yet produced, and that he proposes to make the attempt as soon as is possible.

For such machines he proposes to use opposed cylinder heavy oil engines. Although he does not specifically mention the fact it is known that Prof. Junkers has already carried out a good deal of experiment upon this type of engine, and in the paper he expresses his confidence in the future of the type.

SOME MORALS.

The story of Junkers aircraft outlined above is in many respects a remarkable one. The general object after which Prof. Junkers has ever since been striving was clearly present in his mind in 1910—the date of the patent referred to. The first Junkers metal aircraft was not completed till the end of 1915. Considered as an aeroplane that machine was admittedly of no value.

To-day—more than 12 years after the patent, there still does not exist a machine corresponding to his original idea. During practically the whole period Prof. Junkers has maintained an extremely expensive research and experimental staff for the purpose of investigating the very wide range of problems to which a brief reference is made above.

One does not gather that he is to any extent disappointed or disillusioned. On the contrary it would seem that he is quite well satisfied with the technical progress so far made. It may very gravely be doubted if the head of any great British engineering works would have undertaken a task of the nature described above with quite so much thoroughness and quite so much patience.

By this one does not mean to suggest that British aircraft firms in particular are blind to the need for and the value of continuous research and experiment. This is definitely not the case. Generally British aeronautical engineers are fully alive to the importance of the subject.

But it so happens that most British aircraft constructors are either relatively small independent firms—or relatively unimportant branches of big firms—which are expected either to pay their way or at least to cost relatively little.

GERMAN AND BRITISH METHODS.

Prof. Junkers is, one understands, the responsible business head of a very large engineering concern. He is also a highly scientific engineer himself—a combination practically unknown to this country. And therefore he was able to start upon his programme of aircraft development with a fair idea of the immense amount of work which would be necessary to realise it—and consequently of the probable cost of that work.

It would be very difficult indeed in this country to find a firm with the financial strength required to undertake a work such as that described, controlled by a responsible director with enough technical knowledge to realise what was involved in such a task and enough imagination and foresight to realise that it was worth undertaking.

The process by which the majority of modern aircraft have been produced both in this country and abroad has its merits. The step-by-step production of new machines each a limited advance upon the previous one leads to steady and continuous improvement and produces results of definite value in a relatively short time.

On the other hand such designs differ one from another only in detail and there is a tendency for progress in detail alone to become slower and slower as the more or less standard type becomes more and more perfect in detail.

The type of advance which leads to the adoption of a new and better type of machine is needed when this stage of stagnation in the previous type is reached.

Advances of this type are not made by a happy chance—they need usually long forethought and much experiment before they become of practical value. There is a very great tendency in this country to prefer the process which leads rapidly to small results and to shirk the pursuit of those larger ends which can only be reached after a long period of labour and expense, and for this reason one must regret that we have not in England a few counterparts of Prof. Junkers.

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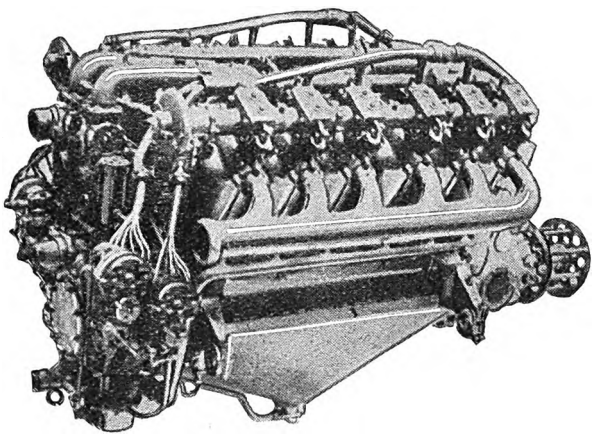

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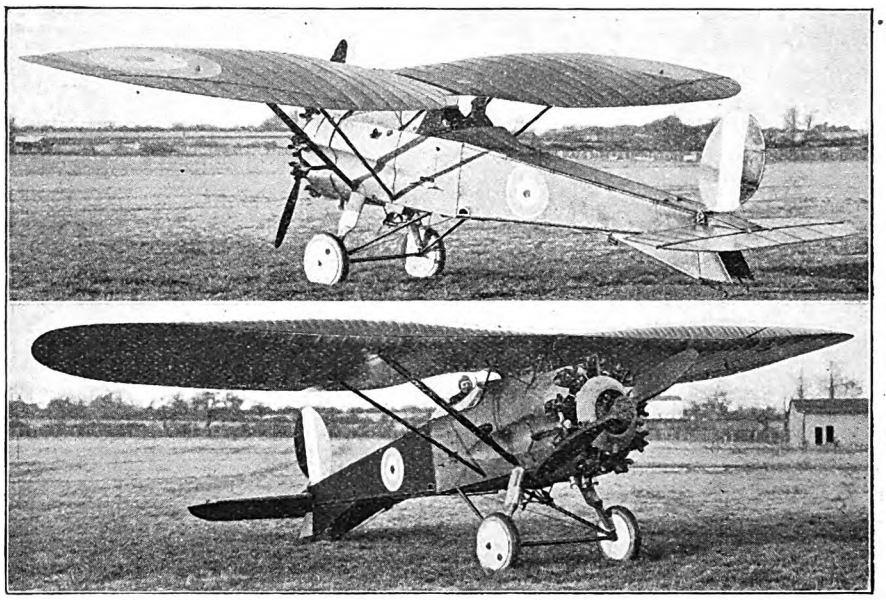
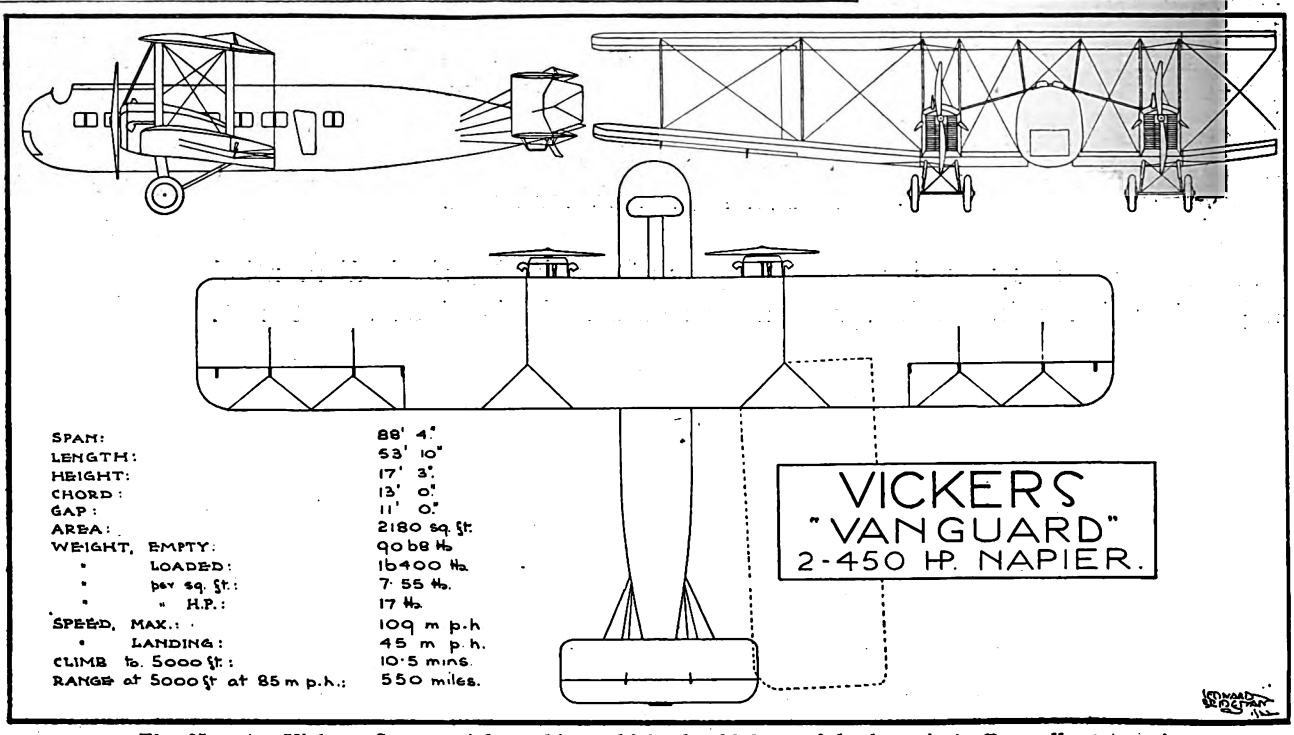


A NEW BRISTOL.—The two photographs here reproduced show the Bristol "Bullfinch" which has just been constructed by the Bristol Aeroplane Co. Ltd. for the Air Ministry. As usual with new miltary machines it is not permitted to publish any technical details—but a number of features of interest are apparent from the illustrations.

The curious wing form—very thick over the bracing struts and tapering both to tip and to centre line—is a novel feature in British machines. Another curious feature is the twin tail skid arrangement.

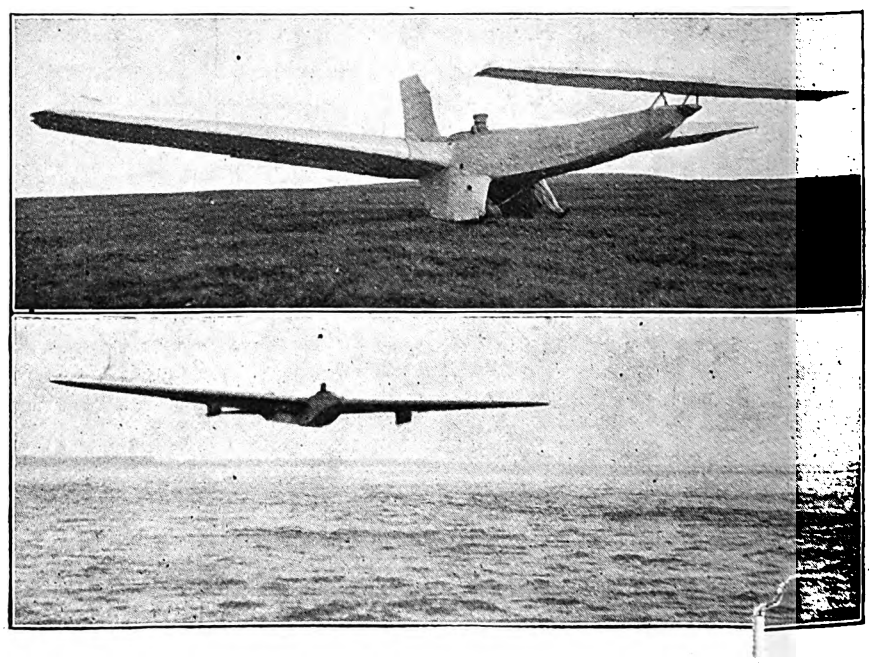


SPAN:	88' 4"
LENGTH:	53' 10"
HEIGHT:	17' 3"
CHORD:	13' 0"
GAP:	11' 0"
AREA:	2180 sq. ft.
WEIGHT, EMPTY:	9068 lb.
" LOADED:	16400 lb.
" per sq. ft.:	7·55 lb.
" " H.P.:	17 lb.
SPEED, MAX.:	109 m.p.h.
" LANDING:	45 m.p.h.
CLIMB to 5000 ft.:	10·5 mins.
RANGE at 5000 ft. at 85 m.p.h.:	550 miles.

The 25-seater Vickers Commercial machine which should be useful when air traffic really gets going.

MORE GLIDERS.—At the top is Dr. Klemperer's two-seater tail-first machine with slotted ailerons, which has now been rebuilt after its crash at last year's Rhön meeting. It has now been fitted with a normal rudder instead of the original method of steering by rocking the elevator. The great idea of the forward elevator is to use it as a "gust-feeler."

Below is seen the start of the "Baatz" seaplane glider. At the extreme right margin of the photograph is the stern of the anchored boat to which it was tethered, and, if the process block be sufficiently well printed the tow line from the boat to the nose of the glider will just be visible.



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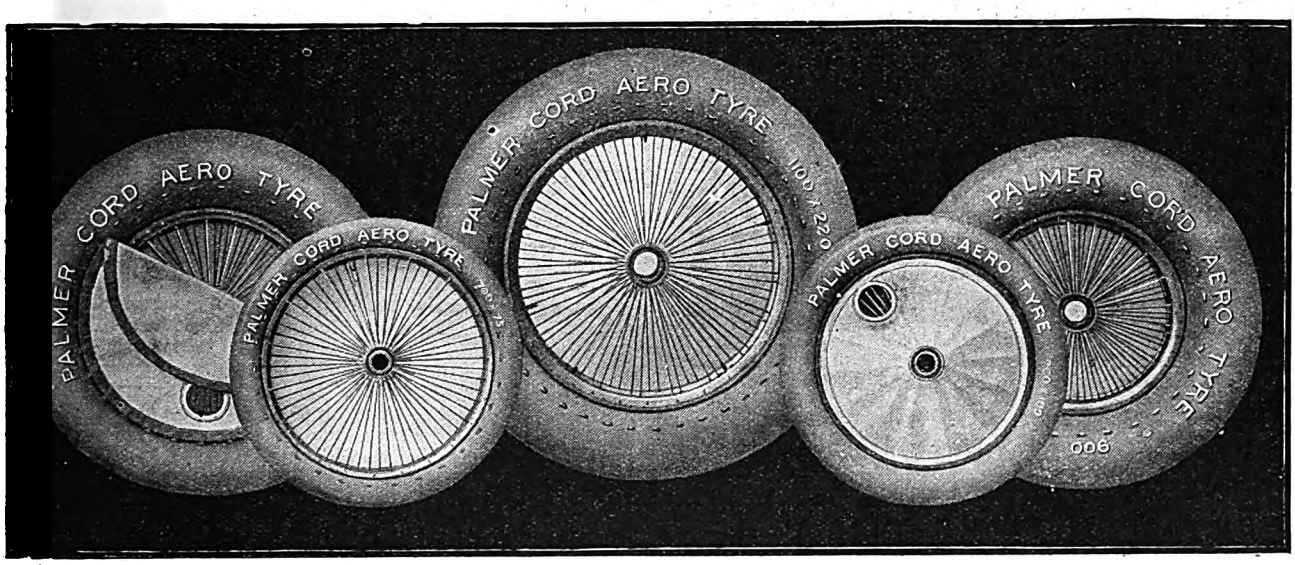
PALMER

LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
,,	138	130.	38.09	Central
575×60	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
600×75	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
700×75	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
700×100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
700×100	96	178.	55.	132/46
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
650×125	119	178.	55.	132/46
750×125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	96	178.	55.	132/46
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
800×150	82	185.	55.	135/50
,,	85	185.	55.	Central
,,	36*	185.	55.	135/50
,,	40*	185.	60.32	135/50
,,	152	185.	66.67	135/50
,,	163*	185.	66.67	135/50
1000×150	131	220.	66.67	Central
,,	102	185.	55.	125/60
,,	141	250.	80.	Central
,,	201	185.	60.32	125/60
1000×150	209	185.	55.	Central
,,	210	185.	60.32	Central
1000×180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
900×200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	202	85.	60.32	Central
1100×220	134	220.	66.67	Central
,,	136	250.	80.	Central
1250×250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500×300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
1750×300	139	400.	152.4	Central

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THE CORSICAN CRASH.

On the morning of January 10th one of the "Aeronavale" seaplanes on the regular service between Antibes and Ajaccio crashed on the side of a hill near Ajaccio, killing the pilot, and three English passengers, and severely injuring the wireless operator.

The machine piloted by M. Desnoyelles, left Antibes at 8.30 a.m. and was about to alight near Ajaccio when according to the Press the wings were seen to collapse and the machine fell into a wood. The pilot, and the three passengers, Major and Mrs. Jeffreys and Capt. Macking, were killed and the wireless operator M. Malpel sustained a fractured jaw and a broken leg.

A well-known American aeronautical authority who made the trip from Antibes to Ajaccio with M. Desnoyelles four days earlier states that the machine involved was a twin-engined flying boat built by Lioré et Olivier, of the same type as that exhibited at the recent Paris Salon. The machine is said to have flown quite well, but there was violent vibration set up by two eight-cylinder engines which caused violent oscillation of the flying wires. As these were of the single streamline type, it is by no means impossible that failure of the wing bracing occurred. This view is the more plausible because certain specimens of French-made streamline wire seen at Paris showed defects of manufacture of a most serious type.

A compass course from Antibes to Ajaccio would take the machine across the promontory which separates the Gulf of Ajaccio from the Gulf of Sagone, and it was over this piece of land that the accident occurred. A course skirting the promontory would have added not more than a minute or two to the journey and could safely have been flown at 5 ft. from the water, in which case the wings might have collapsed with practically no risk to the occupants.

VILLACOUBLAY: A CONTRAST.

During December very bad weather prevented the usual reception of "*avions de serie*" and all the French firms were behind the time imposed on them by the Section Technique for delivery of contract aircraft. It is reported that in addition to the weather, this is caused by the numerous modifications imposed on the constructors day by day such as reinforcement of fuselages, new pipe-lines, alteration to radiators, etc. Thus it will be seen that British constructors are not the only people who suffer from the vicissitudes of official experts.

However this holding up of deliveries resulted in the Nieuport hangars being full to bursting point with the result that the firm was compelled to hire additional hangar space from Morane. During December M. Rost a pre-war artist and speed man on Deperdussin monoplanes joined the Nieuport Astra firm as test pilot, and together with Lasne, Berthelin and Rajac feverishly "receptioned" 29 C.1s when the weather permitted.

At Morane's M. Fronval has been kept hard at it putting Nieuport 29 C.1s, built by Marcel Besson, the flying-boat constructor, through their reception tests.

The two-seater Goudrou-Lesseure fighter is awaiting test, the second Wibault B.N.2 is being fitted with a 700 h.p. Fiat engine in place of the 600 h.p. Renault and M. Pitot has been carrying out torpedo-dropping tests with the Levasseur A.T.1.

MM. Thiery and Dintillac have been testing Bréguet-built Brèguets, Bruceau Zodiac-built Bréguet 14 A.2s and Petit Bernard-built Bréguet 16 B.N.2's. Gaubert, a pre-war R.E.P. pilot, was testing Schreck-built Nieuport 29s.

Also flying has taken place on Lioré et Olivier, Hanriot, Potez and Morane machines of various types. Owing to the congested state of Villacoublay all constructors are now obliged to deliver their aircraft to Le Bourgêt.

THE GOTHENBURG SHOW.

It appears that there is some chance of Great Britain being represented at the Gothenburg Aero Show in July this year. There is some talk of the Vickers Company sending a machine and probably the Napier and Rolls-Royce firms will exhibit engines.

In view of the fact that the French Air Department has actually taken a space of 100 square metres in which to display propagandist exhibits on behalf of French aviation in general and that a French service *escadrille* will probably go to Gothenburg to display the prowess of French aviators it is to be hoped that the British Air Ministry will itself send adequate representatives to assist this new form of diplomacy.

A NEW GLIDING RECORD.

It is announced in the daily Press that M. Bossoutrot, flying a Farman glider near Boulogne on January 24th, made a flight of 3 hours 31 mins., thus beating the record made at Itford by M. Maneyrol.

THE AIR CONFERENCE.

On Tuesday and Wednesday next, February 6th and 7th, the third Air Conference will be held in the Council Chamber of the Guildhall. On the preceding day, Monday, February 5th, a visit will be paid to the London Terminal Aerodrome at Croydon when presumably the usual parade of Air Ministry white elephants will take place.

The Chairmen at the Conference for the four different sessions will be Lieut.-Col. the Rt. Hon. Sir Samuel Hoare, Bt., C.M.G., M.P., Secretary of State for Air; his Grace the Duke of Sutherland, Under-Secretary of State for Air; Sir Henry P. Maybury, K.C.M.G., C.B., Director-General of Roads, Ministry of Transport; and Sir William Joynson-Hicks, Bt., M.P., Parliamentary Secretary, Overseas Trade Department.

The forenoon of the 6th will be devoted to papers on Air Transport and the afternoon of the 6th to technical papers. On the second day debates will be held on the papers read on the previous day.

GOOD WORK IN CANADA.

During the past summer the Laurentide Air Service and its associated firm the Fairchild Aerial Surveys Company (of Canada) Ltd. have done a very considerable amount of work. They put in as much as 600 hours' flying for the Ontario Government and hope to do considerably more this year. The bulk of this work was done to enable the Government foresters to sketch the timbered and burnt areas as the forest reserves of Canada have been considerably altered by forest fires in the last year.

A good deal of photography was also done for the Ontario Government by the Fairchild Co. 450 square miles were surveyed for the Bank of Montreal, 250 square miles for the Laurentide Co., that is to say the big timber concern and not the Laurentide Air Service, and a mosaic of over 50 miles of river was made for the Shawinigan Water and Power Co. together with a mosaic of a proposed storage dam. Also a numbeer of oblique photographs of factories some showing building in progress, were made.

The Laurentide Air Service had now acquired quite a considerable air fleet. Last summer it had in service five flying-boats and two land machines and in the coming summer it will have eight or nine machines at least. In addition to its head office it has two complete air stations with machine-shops, mechanics and pilots. During this winter the firm is building new boats for itself which at any rate ought to be an improvement on having to fly superannuated American H.S.2Ls.

The Fairchild Co., which is connected particularly with the Fairchild camera, have cameras and skilled operators of their own and a well-equipped laboratory for printing, developing and enlarging and also for the mounting and assembling of mosaics. The quality of the firm's work may be judged by the fact that some of their ordinary whole-plate photographs have been enlarged up to 40 inches by 50 inches without blurring.

ROLLS-ROYCES IN THE COLONIES.

Important developments in commercial flying are in progress in several of the British Colonies. In South Africa it is proposed to establish an air service for passengers and mails between Capetown and Johannesburg, calling at Bloemfontein en route. Subsidiary services to Pretoria and Durban are also contemplated. The Government of South Africa will support these routes.

In New Zealand a regular service for goods and passengers is proposed between Gisburn and Auckland. In Australia no less than four air mail routes have been authorised with Government support. These will cover the following routes:—Geraldton to Derby (Western Australia), Sydney (N.S.W.) to Brisbane (Queensland), Sydney to Adelaide (South Australia), and Charleville to Cloncurry (Queensland).

In all cases British built areoplanes will be used exclusively, and it is a remarkable tribute to their world-wide reputation for reliability that in every one of these routes Rolls-Royce aero engines have been selected for use.

BOOKS WANTED.

If any reader of The Aeroplane has in his library copies of Mr. F. W. Lanchester's two volumes entitled "Aerodynamics" and "Aerodonetics" respectively which he is willing to sell, would he please notify the Editor, The Aeroplane, 175, Piccadilly, W.1, stating the price? [N.B.—Letters addressed "The *Technical* Editor" will receive more immediate attention.—Ed.]

SLIDES WANTED.

A former flight-commander R.A.F. and technical manager of an air traffic company would like to borrow fairly modern lantern slides from aircraft manufacturers or private persons for propaganda lecture during the first or second week in February. J. D. Atkinson, Esq., c/o James Dover and Sons, Millthrop Mills, Sedbergh, Yorks.

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R.A.F. INTELLIGENCE

Appointments.

From *the London Gazette.*

AIR MINISTRY, Jan. 23rd.

MEMORANDUM.—Maj.-Gen. Sir H. H. Tudor, K.C.B., C.M.G., is granted a temporary commission as an Air Vice-Marshal whilst commanding the Forces in Palestine (Sept. 1, 1922).

[Sir Henry Tudor was formerly Chief of the Royal Irish Constabulary Auxiliary Cadet Force in Ireland, commonly and erroneously known in England as the "Black and Tans." He was made a K.C.B. in the New Year's Honours. He was seconded by the War Office to the Colonial Office for duty as G.O.C. the Forces in Palestine and Trans-Jordania and Director of Public Security last year. He commanded the 9th (Scottish) Division in France in 1918, and received the C.B. and C.M.G.]

AIR MINISTRY, Jan. 24th.

GENERAL DUTIES BRANCH.—S/Ldrs. E. A. B. Rice, M.C., from Air Pilotage School (Cadre) to command No. 11 Squadron, 15/1; R. H. Jones, O.B.E., from No. 5 F.T.S. to Half-pay List, 3/1.

F/Lts. T. E. B. Howe, A.F.C., from Air Pilotage School (Cadre) to No. 11 Squadron, 15/1; R. C. Hardstaff, from No. 47 Squadron (M.E.) to No. 8 Squadron (Iraq Command), 26/12; A. E. Gendle, O.B.E., from H.Q., R.A.F., Middle East, to H.Q., Iraq Command, 26/12; E. J. D. Routh, from No. 14 Squadron (Palestine Command) to No. 30 Squadron (Iraq Command), 26/12; A. G. Taylor, A.F.C., from No. 1 F.T.S. to No. 2 Squadron (Supernumerary), 9/1; R. H. Portal, D.S.C., from Royal Navy to R.A.F. Base, Gosport, on appointment to Temp. Commn. in R.A.F. on attachment from the Navy, 8/1.

MEDICAL BRANCH.—Group/Capt. H. Cooper, D.S.O., B.A., from H.Q., R.A.F., India, to H.Q., Iraq Command, 8/1.

F/Lt. A. E. Jenkins, from Air Pilotage School (Cadre) to No. 11 Squadron, 15/1.

DENTAL OFFICERS.—F/Lts. H. H. Mallet, from Aeroplane Exper. Estab. to Electrical and Wireless School, 29/1; H. E. Flavelle, from Electrical and Wireless School to No. 5 F.T.S., 1/2.

STORES LIST.—F/Lt. W. R. Fairbairn, from Aircraft Park (India) to R.A.F. Depot (Supernumerary), 21/12.

AIR MINISTRY, Jan. 26th.

GENERAL DUTIES BRANCH.—Wing/Cmdrs. W. L. Welsh, D.S.C., A.F.C., from No. 1 Group H.Q. to H.Q.C.A. (Supernumerary), 15/1; A. L. Godman, C.M.G., D.S.O., from H.Q., R.A.F., Cranwell, to H.Q., R.A.F., India, 19/1.

S/Ldr. L. T. N. Gould, M.C., from H.Q., Iraq Command, to H.Q., R.A.F., India, 7/12.

F/Lts. R. Halley, D.F.C., from Half-pay List to R.A.F. Depot (Supernumerary), 15/1; G. C. Ahne, O.B.E., from Inland Area Aircraft Depot to Air Ministry (Dept of A.M.P.) (D.D.P.), 2/1; A. W. C. V. Parr, from C.F.S. to Half-pay List, 15/1; A. W. Cuddon-Davis, from No. 25 Squadron (Constantinople Wing) to R.A.F. Depot (Supernumerary), 29/1.

MEDICAL BRANCH.—F/Lts. D. G. Boddie, M.B., from R.A.F. Trans-Jordania H.Q. (Palestine Command) to H.Q., Iraq Command (Supernumerary), 26/12; T. J. Thomas, M.B., from Engine Repair Depot (M.E.) to H.Q., Iraq Command (Supernumerary), 26/12; J. R. Crolius, M.B., from H.Q., R.A.F., Middle East, to R.A.F. Trans-Jordania H.Q. (Palestine Command), 3/1.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

FENCING.

The Royal Air Force v. Royal Navy match which took place at Portsmouth on the 17th resulted in a draw of two events and eighteen victories each. The results in the various arms were as follows:—

Foils, Air Force won (6—3); Epées, Air Force won (6—3); Sabres, Navy won (6—3); Bayonet, Navy won (6—3).

R.A.F., MEDITERRANEAN.

During December No. 267 Squadron played three football matches, two of which were lost (Sliema Rangers, 0—5, and R.A.S.C., 0—1), and the remaining one against the R.G.A. resulted in a draw with no score.

Three hockey matches have also been played but with better result. The first against H.M.S. *Egmont* was drawn (2—2), both goals being scored by AC. Howell; and the second resulted in an easy victory over H.M.S. *Caradoc* by 6—0, the goal scorers in this instance being F/Lt. Elmhirst (3), F/Lt. Stewart, Sgt. Southgate and Cpl. Dunn 1 each. The remaining match against H.M.S. *Egmont* was lost by the odd goal in five. Both the Air Force goals were scored by F/Lt. Elmhirst.

R.A.F. versus The Arsenal.

ASSOCIATION FOOTBALL.—This match was played at High Wycombe on the 24th instant before about 3,000 people. From the kick-off the Arsenal immediately attacked but were unable to score. The play was then transferred to the other end where Dempsey scored for the Air Force. Five minutes later, Barry, after a brilliant individual effort on the left wing, put in a fine cross-shot which struck the inside of the post and passed into the net. The Arsenal then made several attempts to reduce the lead and Anderson scored rather an easy goal.

In the second half the Air Force again scored through Dempsey and Weaver and the Arsenal through Turner and Young, the last-named player making a fine individual effort. During the last ten minutes the Arsenal made desperate efforts to draw level, and it was only owing to the stubborn defence of F/O. Hadley that they were unable to do so.

A feature of the afternoon's play was the combination of the Air Force forwards, Barry, being in particularly good form.

TEAM.—F/O. Hadley (24 Sqdn.); Sjt. Nicholls (I.A.A.D.), Sjt. Fretwell (100 Sqdn.); AC. Chandler (Cranwell), F/O. Dickson (Depot), AC. Wingrove (I.A.A.D.); Cpl. Francis (Cranwell), AC. Weaver (Halton), Cpl. Ayres (Cranwell), AC. Dempsey (M.T.R.D.), AC. Barry (Cranwell).

FIXTURES FOR FEBRUARY.

February 3rd, Rugby, R.A.F. v. Cambridge, at Cambridge.
February 7th, Hockey, R.A.F. v. Army, at Halton.
February 8th and 9th, Boxing, Team Championships, at Margate.
February 9th, Association, R.A.F. v. Maidstone, at Margate.
February 10th, Rugby, R.A.F. v. Blackheath, at Blackheath; 13th, 3rd round inter-unit Rugby Competition to be completed; 14th, R.A.F. v. R.N., at Twickenham, 14.45 hrs.
February 15th, Hockey, R.A.F. v. R.N. at Portsmouth.
February 16th, Fencing, R.A.F. v. Army, at Bertrands; 21st, R.A.F. v. Bertrands, at Hanover Square, London, W.
February 22nd, Rugby, R.A.F. v. U.S. (Devonport), at Devonport; 24th, R.A.F. v. Bath, at Bath.
February 28th, Association, R.A.F. v. London University, at Halton.

[*Un-Official.*]

"R.A.F. Rugby."

A letter has been received from F/Lt. Wakefield, the Skipper of the R.A.F. Rugby team, in which he explains that as the captaincy of the Cambridge team ends after the 'Varsity match and the R.A.F. do not begin their representation matches until January, he is not Captain of two teams at the same time as inferred in THE AEROPLANE of Jan. 24th.

F/Lt. Wakefield also states that he has always put the Air Force first and will always continue to do so and that he would not have accepted the captaincy of the Cambridge team last term unless he had been quite certain that the duties such an office demands would in no way interfere with his duties towards the R.A.F. team.

One regrets that what was intended for helpful criticism has been taken as a personal insult.—C. M. MCA.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Jan. 28th:—

LONDON—PARIS:

Handley Page Transport, Ltd., machines 10*, passengers 47. Air Union, machines 12†, passengers 12. Total machines 22, passengers 59.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 10*, passengers 39.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 20, passengers, Manchester-London, 6, London—Amsterdam, 13.

LONDON—ROTTERDAM:

K.L.M., machines 11, passengers 14.

SPECIAL MACHINES, 0.

Total number of trips by British machines: 40, carrying 105 pas.
Total number of trips by foreign machines: 23, carrying 26 pas.
Trips per day.—Monday, 5; Tuesday, 11; Wednesday, 12; Thursday, 12; Friday, 11; Saturday, 12; Sunday, 0.

STATISTICS.

Machines, 63; Passengers, 131; Crews, 123; Total Personnel, 254.

Corresponding week last year:—

Machines, 13; Passengers, 30; Crews, 20; Total Personnel, 50.

Corresponding week, 1921:—

Machines, 15; Passengers, 5; Crews, 17; Total Personnel, 22.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morring machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

THE AIRCRAFT DISPOSAL COMPANY.

Mr. Piercey has been testing the D.H.9a with Rolls-Royce engine and two Lamblin radiators during the week. He made two flights with it on Monday and was up again on Thursday. He had hoped to leave for Madrid on Saturday but did not manage to get away. The machine is fitted with five machine guns.

On Monday Capt. Rex Stocken was testing a D.H.9 and Mr. Perry left for Dublin on a similar machine. The following day Capt. Stocken was testing the D.H.9 again and on Wednesday an Avro. On Thursday Mr. Perry was testing the D.H.9 on which Capt. Stocken had been flying and on Friday he (Mr. Perry) left on that machine for Dublin.

A VARIETY OF VETERANS.

Next Monday those attending the Annual Air Conference will visit the aerodrome to inspect the very latest in commercial aircraft. Presumably this means another outing for

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THE AMPHIBIOUS GLIDER.—Mr. F. P. Raynham's Handasyde glider on the water at Torquay during the making of the film "The Hawk." To make the glider seaworthy it was given an extra coat of Cellon Dope which proved in every way satisfactory. The battery of kinema cameras on the shore is seen making the picture.

the white elephants of the Department of Civil Aviation. The very latest types such as the "Viking III." and the Napier-Westland and the time-expired "18s" etc. will doubtless be shown off as the very latest types and will all be solemnly wheeled out on the aerodrome and drawn up in review order. There ought to be some sort of medal given for these ancient stalwarts with a bar for each Conference which they have attended, this being the third for the Viking and the Westland and one of the "18s." However they should prove of interest now that the late King Tut-Ankh-Einstein (or whatever was his name) and his heir-line is causing such a boom in antiquities.

ELEPHANTIASIS.

A somewhat different hardy annual will also appear at the Conference. This is the Gloucestershire Aircraft Company's "Bamel" with Napier "Lion" engine. This is the "Bamel's" second Conference. It will be remembered that last year for various reasons it was not ready to fly until all members of the Conference had left. Doubtless this state of affairs will be altered this year.

Incidentally one is told that the Gloucestershire Aircraft Company are to build a new Napier-engined racer for the speed events of the year. Doubtless Mr. Folland will produce another machine capable of beating the World's Record for speed.

"WHEN THE SUN GOES DOWN."

On Monday of next week the experimental night service between Croydon and Paris will begin. It is being undertaken on behalf of the Air Ministry by the De Havilland Aircraft Co. It will be operated nightly for a month in all possible weathers, the machine making a trip to Paris and back every night. Mr. Alan J. Cobham will make the first flights on a D.H.9 starting from Croydon at 18.30 hrs. His remarks *en route* should be of interest to listeners-in on the 900 metre wave-length.

THE AIR LINES.

The Air Lines have had a better week on the whole as regards weather and Handley Page Transport, the Daimler Airway and the Instone Air Line have all been carrying more passengers than lately.

Mr. Cogni has been away in Warsaw for some time and the General Manager of the Daimler Airway has been to Wiesbaden attending an Air Conference.

During the run of the Trades Fair at Castle Bromwich from February 17th the Daimler Airway will there stop their Manchester machine on both the outward and return trip. The fare between Castle Bromwich and both London and Manchester will be the same as the first-class train fare and as the exhibition actually is held on the aerodrome at Castle Bromwich it should prove a big boon to business men.

AND A GOOD JUDGE TOO?

The chief topic of conversation has been the arbitration case Instone *v.* Vickers before Sir Justice Brancker which has been occurring at the Air Ministry during the past fortnight. Instone's are suing Vickers because the former allege that the "Vulcans" supplied to them are not up to specification. In order to save legal expenses both sides agreed to accept Sir Sefton Brancker as arbitrator. The learned counsel in the case are Lt.-Col. W. A. Bristow for Instone's and Mr. Oliver Vickers for Vickers. One fancies in a battle of words and wits any side featuring Col. Bristow must start favourite, no matter who was the adversary or what was the subject.

HALL-MARKED.

It is interesting to note that Mr. "Sammy" Hall, who served the firm of D. Napier & Son Ltd. so well and so long until they closed down their Croydon depot, has now gone into partnership with Mr. Brenard for the manufacture and supply of wireless apparatus. Their headquarters are at 10, Manor Gardens, Purley, and anyone interested is invited to get in touch with them at that address. All who remember the conscientious way in which Mr. Hall nursed the "Lion" engines at Croydon may be quite sure that they will get good value in any wireless plant they obtain from the new firm.

SURREY ACTIVITIES.

The Surrey Flying Services are carrying on with work in the sheds and taking up joy riders when the weather is fine. The dual control Avro is ready for erection and when complete Mr. Muir will give instruction to some pupils. The first will be Mr. Dighe an Indian subject who has been learning the trade in the Surrey Flying Services workshops for 18 months. When he has been passed out he will return to India and take charge of some D.H.9s and Avros which were presented by H.I.M. Government to Mr. Dighe's State.

—C. D.

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During the last two months the B. A. Co. have visited Basingstoke, Wokingham, Dorking and Red Hill. Although the weather conditions have been very unfavourable for flying, passengers have turned up for flights, and onlookers to watch the exhibitions, whenever the weather has allowed.

On Christmas Day, in spite of continual heavy rains and wind, some half-dozen trips with passengers were made at Dorking, and on Boxing Day 45 people were carried.

In the afternoon the firm noted with pleasure the arrival of their old pilot and confederate Mr. A. L. Robinson, now an Instone pilot, who together with a friend and Mr. J. C. C. Taylor had motored over from Croydon. In the evening the party, plus Mr. J. D. V. Holmes, returned to Croydon.

Mr. Taylor, the firm's ground engineer, and partner of Mr. Holmes, has now sufficiently recovered from his operation to return to duty.

A BLISSFUL PLACE.

On a recent occasion a telephone message was put through from the office of THE AEROPLANE to Marconi House to inquire the wave-length used by aircraft on the cross-Channel air lines.

The answer received was "We don't know! How do you expect us to know?"

Possibly Marconi House works on the principle that where ignorance is bliss 'tis folly to be wise, but one would have expected G.H.Q. wireless to know something about its own products.

For the information of Marconi House and others it may be stated on the authority of Ogilvie and Partners Ltd. and the Croydon Wireless people that the wave-length used by aerial aircraft operating in or from or to England is 900 metres.

A GLIDING RECORD.

M. Maneyrol on the Peyret tandem monoplane on which he won the *Daily Mail* gliding prize at Itford Hill succeeded in remaining in the air for 8 hours and 3 minutes at Vauville near Cherbourg. Starting at 13.15 hours he landed at 21.18 hours. During the latter part of the flight the darkness was alleviated by flares.

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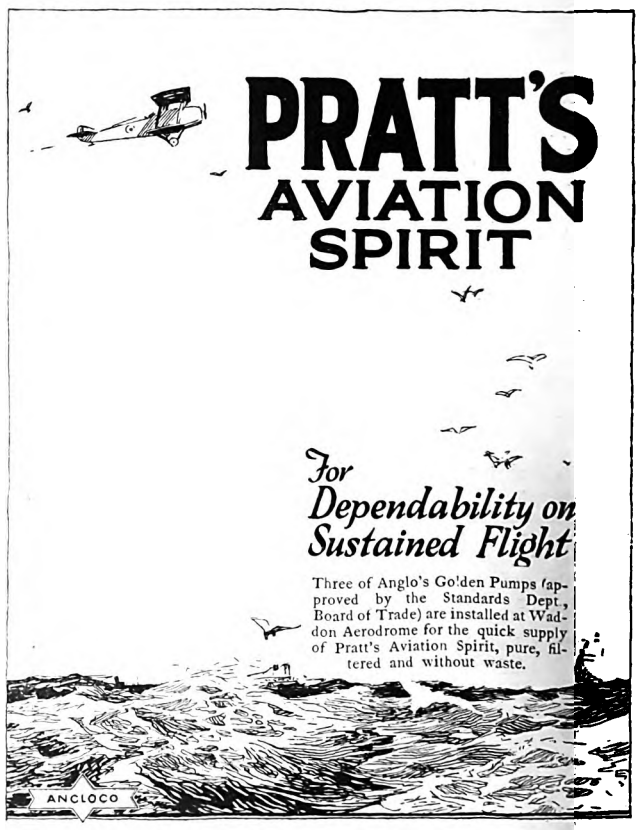
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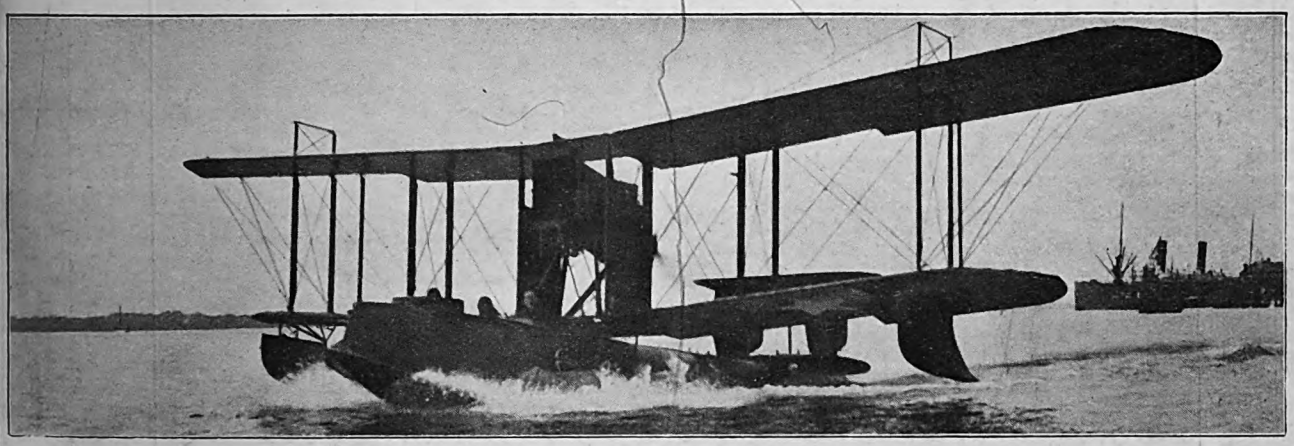

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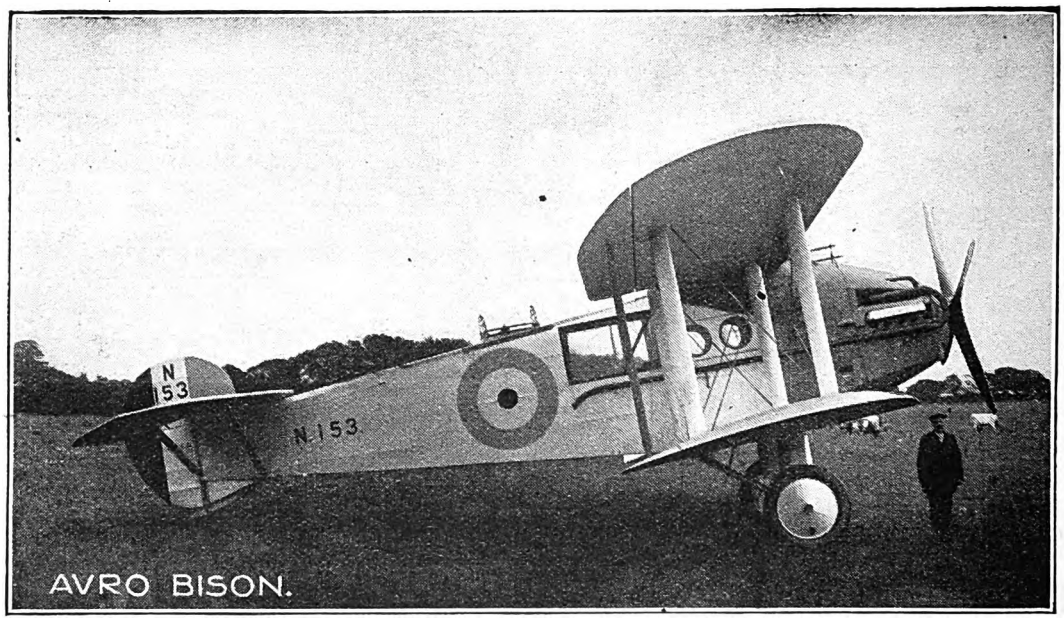

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ON TWO BOOKS.—I.—*continued.*

In the Great World.

Baring's sojourn at Cambridge, still in the endeavour to become a diplomatist, introduces the reader to a number of people whose names are now famous. One is inclined to wonder whether the modern youth at Cambridge is as clever as they were. If he is it is surprising how undergraduate literature hides his cleverness.

Also during this period of not too absorbing study Maurice went to Italy and from that visit also one learns much. Few have described the essential Italian so graphically and seldom does one meet the upper-class Italian on such familiar terms. Count Pasolini alone is a character which ought to be put on the stage.

By way presumably of adding the Oxford manner to the education of Cambridge Maurice also took a turn at the Senior University. Here again one meets all sorts of interesting people, from Hilaire Belloc upwards and downwards.

At last he did manage to scrape into the Diplomatic Service, and then the reader is introduced to everybody who counted for anything in what was certainly one of the most brilliant periods in French art and literature. A whole chapter is deservedly devoted to an exposition and a eulogy of Sarah Bernhardt, certainly the greatest actress of a century and a half. Never has one read a personal memoir which made one feel so well acquainted with its subject as does this chapter. Those who have never seen the Great Sarah will after reading it end by believing that they have seen her.

The joys of Diplomacy in Paris and Copenhagen as described by Maurice help one to understand how it is that foreign diplomatists are so often defeated by the English. The apparently hopeless irresponsibility of the staff of the Embassy in Paris disguising so completely their sound common sense and devotion to duty must have been utterly confusing to their competitors. But the story of the ink fight in the Chancery really ought to have been written either in the manner of *Chevy Chase* or in Homeric hexameters.

On the more serious side one gets some quite fresh views of the famous Dreyfus case which lay bare some of the weak spots in the French character. Also Maurice helps one to understand how it is that France with her essentially feminine characteristics having been saved from German conquest by her Allies is now dominating Europe by much the same means as those used by a woman who has discovered that a house is governed by the most disagreeable person in it. One cannot recall any book in which one gets so comprehensive an impression of France in so small a space.

There is also a short section concerning a brief period served in Copenhagen. It would seem that Denmark's chief impression on Maurice's sensitised brain was one of Scandinavian gloom of the true Ibsenitish brand. But for one amusing incident, due to himself, his Danish experiences are like an underexposed photograph, doubtless due to the gloomy atmosphere and the short exposure.

The Greater Work.

Then at page 263 we come to Russia and Manchuria. So far the book has been of educative value by reason of the past. Thereafter its value is for the futurre.

Baring went to Russia in July 1902 as the Guest of Count Benkendorf, the Ambassador in London of His Imperial Highness the Czar, and from then until the outbreak of war in 1914 he spent at least as much time in Russia as he did in England. He learned to know Russia as very few Englishmen know it and he has set down in his book much that will be of high value in the next war.

In this recent little inter-tribal scrap of only four years' duration Maurice's intimate knowledge of France, and the French people and their language did great service to the R.F.C. and its Chief. He is still a young man and one hopes that in the greater war that is to come his still greater knowledge of Russia may be of correspondingly greater service to the Chief of the British Expeditionary Force which will in the logical outcome of events be chiefly an air force under an Air Chief, with sea and land forces under him as in Somaliland.

The remaining 170 pages of the book deserve to be studied as well as read for entertainment, for as all writers of intelligence on war are never tired of preaching—all the way from Clausewitz and Hamley to General Swinton in "The Third Degree"—almost the most important section of a man's education for war is the study of the psychology of his opponent. And here you have the psychology of the Russian laid bare by a keen yet almost unconscious observer.

It is certain that nothing was further from Baring's mind when he wrote this book than the possibility of his work being of military use. Yet it is probable that it will teach far more of Russia and the Russians to an intelligent reader than the deliberately educative books which will be produced hereafter. And withal it is a highly entertaining and amusing narrative.

The author's first serious contact with the Russians was in January 1904 when he went to Moscow to learn Russian. Here one finds the same clear impressions of everything which one found in his descriptions of Germany and Paris, and one begins to feel that the Russians are inevitable.

The Russian Nightmare.

Subtly and unintentionally Baring conveys that feeling like a nightmare that there away in the East is a vast mass of people who are a permanent menace to our Western culture, the product of Greek and Latin intelligence and Teutonic good sense. One feels that there in the East are millions of human beings of a sort: some with brilliant brains, the vast majority merely a step above the brutes, but all devoid of sense and intelligence as we understand the words; people without morals, without self-control, with the purely animal passions which impel a beast to suckle or eat its young as the fit takes it.

They are a continent not a nation. The Mongol is constructively cruel, the true Russian merely passively brutal. The Aryan Cossack, the Mongol Tartar, the Gothic Balt are as different as the French, German, and English or even more so. Left alone they are harmless as an avalanche is harmless. The danger lies in the rising of a man who can take control of that mass and start it moving Westward.

Napoleon Bonaparte failed because he tried to conquer from West to East, against the laws of Nature. The Russian Napoleon, who must of necessity be as little a Russian as Napoleon was French, will have an easier task because he will be moving with the stream.

There is nothing of all this in Maurice's book, yet in reading the book it is impossible to help feeling that some day this insensate mass must move West as our own forefathers moved only a thousand years or so ago.

The Army and the People.

Having discoursed of his stay in Moscow Baring describes his journey to the Russian Army in Manchuria where in the futile but fatalistic Russian way a few ill-equipped, badly-led, Russian corps were standing up to the highly-efficient Japanese armies. He gives no account of the strategy of the campaign. There is nothing of Rennenkampf's cavalry raid down the Sha-Ho, nor of old General Kaulbars' gallant efforts, nor is there anything of Kuropatkin's trouble with Alexeieff. But one lives with the Russian troops and realises what a great leader with an able staff could do with such an ignorant, obedient and stupid mass of men.

Later, after a short holiday in London, Maurice returned to Manchuria when the Army was packing up after its defeat. Thence he returned to Moscow then in a state of futile revolution, and one gets an intimate insight into the people themselves.

One gets to know the half-baked intellects of the *Intelligentsia*, the class who were afterwards the cat's-paws of the Jewish Bolsheviks. One sees without being able to understand the utter childishness of the Russian proletariat and one does at any rate understand how the Bolshevik

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leaders found them such easy meat. Also one understands how a great man can in future turn them into an almost unlimited supply of cannon-fodder.

None of the Russian writers, at any rate in their English translations, give so clear a picture as does Maurice. One recognises the types put on paper so-to-say photographically by Gogol, Gorki, Dostoievski, and the rest, but in Maurice's pages as one has said the puppets of his memory are alive. The Russians in the streets, the Russians on the railways, the Russians on their farms are all there to be recognised when we meet them later on the field of battle. One learns to hate and fear them—though Maurice's intentions are far otherwise. One learns to despise their brains but to fear their strength. From these pages the serious student of war in the R.A.F. may learn how to understand them and from that how to kill them when the time comes.

The Minor Slavs.

After Russia Baring again returned to London, but as revolution had broken out in Turkey in 1909 he went thither, being a connoisseur in revolutions. And naturally when the Balkan War began in 1912 he went there again.

Maurice quotes (or misquotes), "*On arrive novice à toutes les guerres.*" That is a phrase to be remembered by our budding Fochs and Haigs and Trenchards. The Balkan War was as different from the Manchurian War as from the recent war with Germany. Yet in the Balkan War there was the mess and muddle which might be expected in a row between the Slavonic Servians and Bulgars on the one side and the Mongoloid Turks on the other. This section is well worth study if only because it elucidates some of points in the Russian character, the Russian being Slav and Mongol together.

There is a final chapter on "The Fascination of Russia" which is as informative and as educative as the rest of the book. And so Maurice takes leave of his readers, who can but hope for more of his entertaining work. He never preaches. He never pretends to have a purpose. But he has a Heaven-sent gift for receiving impressions and setting them on paper. And so one can learn more from him than from many text-books.

An Unneeded Criticism.

One critic of the book has said that more care should have been taken in reading the proofs. Perhaps he is right. There are many obvious mistakes, there are errors in grammar, there are terminal prepositions, and one had suspicions of split infinitives. Also Maurice writes habitually of St. Petersburg, and one believes that its name is correctly Petersburg, being named after Peter the Great and not after the Saint, though probably one is wrong. Still such a book could not be free from errors. It would be unhuman if it were. Men like Maurice put down their impressions and leave them to an intelligent proof-reader, or they ought to do so. Reading proofs, like another occupation to which George IV. referred, is porter's work. As it is the book is the product of an inspired artist and as such he is to be thanked for it.

[N.B.—After the Air Conference one hopes to deal with Major Blacker's book, which, being utterly dissimilar, is a proper complement to "The Puppet Show of Memory."—C. G. G.]

THE CROYDON RALLYE.

The Annual Rallye of Aircraft at Croydon held in connection with the Air Conference took place on Monday. Enormous disappointment was caused by the non-appearance of the Director of Civil Aviation and the famous troupe of white elephants without which no gala-day at Croydon can be complete. These machines are no longer to remain elephants as they have been taken over lock, stock and barrel by the Aircraft Disposal Company who will thoroughly overhaul them and then put them on the foreign market where they will be of real use and not left to eat their heads off in a damp shed. But what happened to Sir Sefton Brancker nobody knew.

Some 300 of those attending the Conference arrived by special train at the Aircraft Disposal Company's private siding on the aerodrome. As they were alighting four A.D.C. machines took the air Major Foot and Mr. Perry were on "Tinsydes," Mr. Shaw on a D.H.9 and Mr. Youell on an S.E.5a. All four put up some very fine trick-flying and Mr. Shaw did some highly-dignified work on the D.H.9.

After that the visitors were taken up in the various air liners, the most active being the Farman "Goliath," on which M. Charpentier performed to great advantage. Mr. George Powell was taking passengers on the "King's Cup" D.H.4a, and later on Mr. Barnard was flying the same machine. One wishes that Mr. Barnard would not do steep "zooms" over the crowd. The object of these Conferences is to show how safe and comfortable is civil flying in civil machines, and not how far can one go without an accident. Of course to those who knew anything his flying actually was quite safe but the people to be converted are the people who do not know.

Mr. Uwins was taking up passengers on the Bristol 10-seater "Pullman" with the "Jupiter" engine, and Mr. Wilcockson took up a Handley Page W.8b.

Mr. "Jimmy" James then started off on the Gloucestershire Aircraft Company's "Bamel." He has been in Athens for four months where he has been doing sterling work for the Gloucester Company and this was both his and the "Bamel's" first flight since Etampes. Before starting off he endured much leg-pulling as to where he was carrying his maps. He flew the "Bamel" as faultlessly as ever and did sharp turns both to the right and left. The Napier engine ran perfectly, and after some terrific bursts of speed he made his usual beautiful slow landing.

Just as delegates were departing the "Avro-Napier" with the 1,000 h.p. Napier "Cub" arrived from Farnborough, piloted by S/Ldr. Roderick Hill, with F/Lt. P. W. S. Bulman and other R.A.F. officers as passengers. S/Ldr. Hill seems to treat this machine wtih all his usual cruelty and stands it on wing-tips in the same way as he treats those nippy little D.H.10s.

Enter not into judgment with thy scribe, oh, Mr. Lord, of A. V. Roe and Co., even though in thy sight no man but the Editor is justified in writing of Avro products. As usual, the Editor did not arrive until the show was over, so please, Mr. Lord, I had to write about it.

On the whole the display of machines at this Rallye was vastly better than usual, there was nothing pre-historic and every machine had a useful record of service behind it, though of course the Daimler Airway's D.H.34 (with Napier "Lion") G-EBBS stands pre-eminent with its 110,000 miles without mishap since last April. At the time of last Conference it was still in the raw material stage and now it holds the World's Record for time in the air.

So many of the habitués of Croydon and so many of the hardy annuals of Civil Aviation were present that to mention any names would cause invidious distinctions.—G. D.

AN INTERNATIONAL PROPOSAL.

For the first time since 1909 there is this year no international air race of classic importance accompanied by an adequate prize now that the Gordon-Bennett and Deutsch cups have been won outright.

No one has come forward to offer a trophy of any sort and so it would seem to be the duty of the Federation Aéronautique Internationale so to do. If all the Aero Clubs affiliated were to subscribe £100 per annum a substantial trophy and monetary prize could be offered. It could be decided by ballot where the first race should be held but thereafter it should take place in the country of the Club that was the holder.

One offers the suggestion to the F.A.I. to consider most seriously as such an annual event is a very great incentive to progress.—G. D.

THE NATIONAL AERONAUTIC ASSOCIATION OF U.S.A.

On October 14th, 1922, there was organised and incorporated at Detroit a new national organisation to be known as the National Aeronautic Association which now takes its place in the United States as the governing body for sporting aviation.

The Aero Club of America practically since its inception has been the body officially representing America in international aviation as a member of the Fédération Aéronautique Internationale, and it is assumed that the new body eventually will become the American member of that august body.

The offices of the Association are at 26, Jackson Place, Washington, which if not the centre of the industry can be recognised as the centre of Government. The officers elected are Howard E. Coffin, President; Bernard H. Mulvihill, Vice-President; Benjamin F. Castle, Treasurer; and John B. Coleman, Recording Secretary, together with two Governors from each of nine districts of the United States corresponding to the army corps areas.

SPREADING THE GOSPEL.

Sir Henry White Smith, Director and Secretary of the Bristol Company, delivered an extremely interesting lecture on Commercial Aviation to the Bristol Rotary Club on January 23rd. After giving a general description of the development of the Bristol Company which itself covers the development of aviation in war and peace, he pointed out emphatically the essential importance of improving communication and transportation within the Empire. As he said "Any method of transportation which can bring one portion of our Empire, say, Australia, nearer to the heart of the Empire—England—is bound to promote closer Imperial relationship and assist the development of business." One only wishes that there were more people with Sir Henry's experience and ability to impress the importance of air transport on such gatherings of business men as these meetings of Rotary Clubs all over the Empire.

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THE AIR CONFERENCE.

The Air Conference began on Feb. 6th, while this paper was in process of going to press. Consequently it is only possible to deal in part with the proceedings of the first day. Such space as is available is naturally given to the papers read by Air Vice-Marshal Sir Geoffrey Salmond and by Major-General Sir Sefton Brancker as representing official views.

These speeches are given in the briefest possible form. Both contained a mass of detail for which THE AEROPLANE could not find room in the present state of trade, though if the Aircraft Industry had been more flourishing and had been able to afford more support to this journal the papers would certainly have been reproduced in full. Doubtless in due course the papers will be published as official documents and will be available to those who desire to purchase them.

In the meantime every effort has been made to include every essential point in each paper. What follows is not a précis but rather a cut-down version of what was actually said.

The Progress of Research and Experiment.

By Air Vice-Marshal Sir W. Geoffrey H. Salmond, K.C.M.G., C.B., D.S.O. (Air Member for Supply and Research, Air Ministry).

Describing the organisation for research Sir Geoffrey said:—

In the first place, there is the Air Ministry charged with the general direction of Research. The Air Ministry is advised by the Aeronautical Research Committee, either on the initiative of the Air Ministry or on the initiative of the Aeronautical Research Committee themselves, as to the problems which require to be solved or as to the methods by which they should be solved. The Aeronautical Research Committee is assisted in its work by the National Physical Laboratory and a whole body of scientists who give their services free to the Nation, as well as by the great universities and consulting engineers.

Practical research is carried out by the Royal Aircraft Establishment at Farnborough and various Experimental stations, such as the Aircraft Experimental Establishment at Martlesham and the Marine and Armament Experimental Establishment, Isle of Grain.

A third organisation also exists and that is the Aircraft and Aero-Engine Constructors who maintain most capable designing staffs, who constantly bring forward solutions of problems.

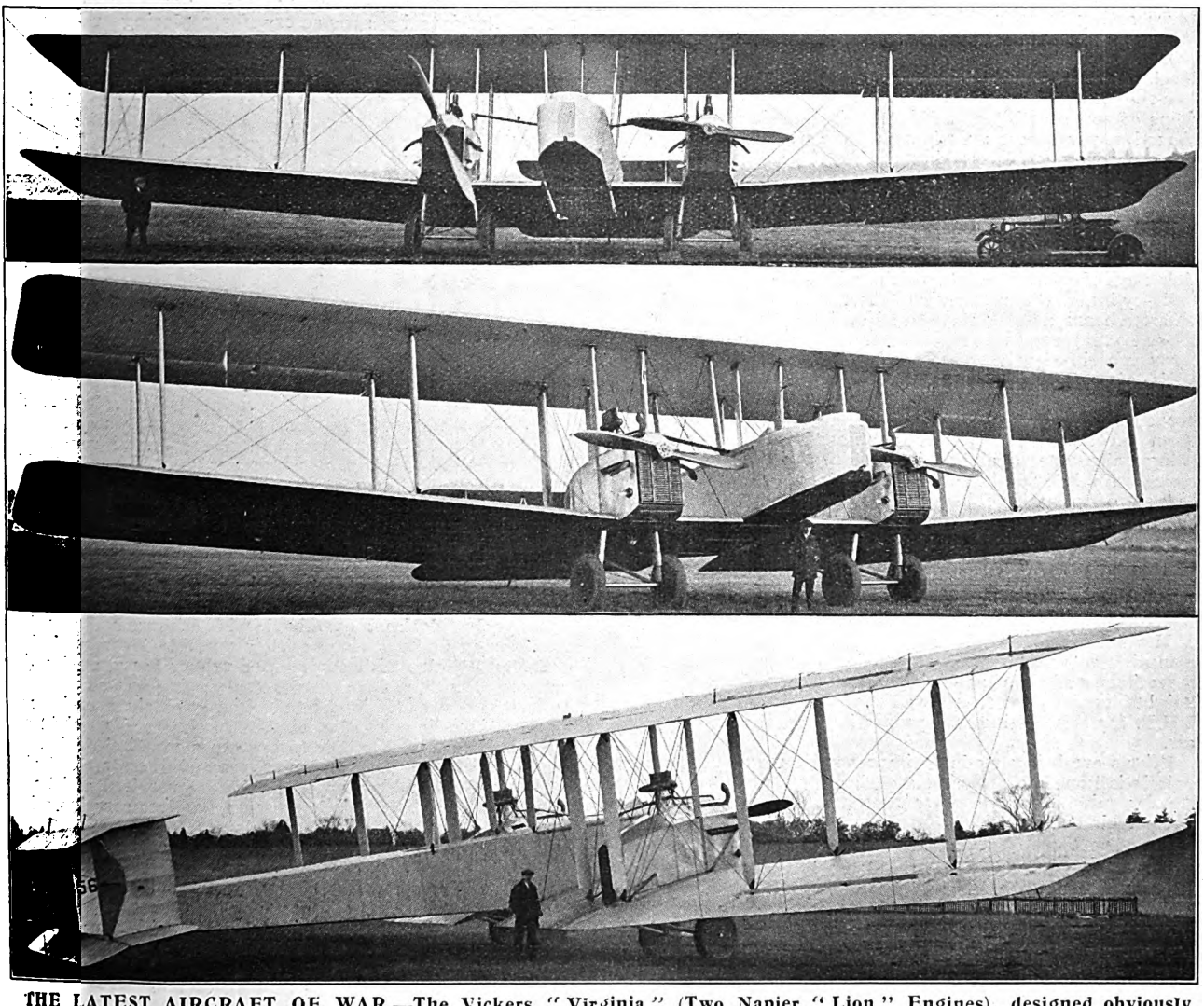
I would be failing in my duty if I did not here acknowledge the debt this country owes to all these organisations, the joint efforts of which have undoubtedly brought our world position as regards Research to a position second to none.

The problems of aeroplane design which we are particularly considering may be divided into three categories: (i) the single-seater fighter, where the essential quality is high performance at altitude, say, above 20,000 ft. (ii) A General Service category embracing many types such as the amphibian, the boat machine, the reconnaissance machine, etc. (iii) The civil aeroplane with which can be coupled the night bomber, troop-carrier and ambulance machine.

With a single-seater fighter it is necessary to run the engine all out to get the requisite performance, and it must therefore be fitted with some means of maintaining power at altitude.

As regards factors of safety, or load factors, it is comparatively easy to stress for normal flight and to determine the factor for a given load so as to produce freedom from breakdown. Where stunting occurs the requirements are more stringent. Research has led us to adopt a factor of four for civil machines where straight flying only is required; but for Service machines a figure of seven is necessary. The more you can reduce this factor the better. In other words, no unnecessary weight must be taken into the air.

General considerations of the strength of the aeroplane lead to the investigation of fundamentals, of which that on materials comes first; but research on materials must be useless unless ease of production and the possibility of bulk production is ensured. These considerations need emphasis.



THE LATEST AIRCRAFT OF WAR.—The Vickers "Virginia" (Two Napier "Lion" Engines), designed obviously for warlike purposes, though the precise purpose is supposed to be an official secret. The size of the machine may be judged from the man and car alongside

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Materials with ostensibly miraculous properties are frequently submitted and sometimes they do possess some of the attributes claimed for them; but they may be prohibitive on account of cost, and more often than not are impossible on the bulk-production basis.

As regards fuel, very valuable research has been carried out and decided advances have been made during the year. Once it is realised that at least one-half of the running cost of an aeroplane is due to fuel, it is evident that research in this direction should be accelerated. The present price of petrol is about £35 per ton, crude oil can be obtained for about £4 per ton, and the same weight of either of these fuels will give approximately the same horse-power. It is of great importance that encouragement should be given to schemes for the direct injection of fuel, both for economy and for doing away with both carburettor and magneto.

Aero-Engines.

Although for Service purposes engines giving as high as 1,000 h.p. are under development, for civil work there is little demand for an engine larger than from 400 to 450 h.p. Where one engine does not suffice the tendency will probably be to use three. With three engines the chance of a forced descent through engine trouble is comfortably remote.

The full advantage of supercharged engines cannot be reaped without a variable pitch airscrew. There is a quite separate demand for a variable pitch screw for Civil Aviation. With the fixed screw the tractive effort when getting off is not in proportion to the torque of the engine and for full advantage of this torque to be obtained it is necessary, in aircraft as in motor cars, for a variable velocity ratio to be employed.

Experiments are being made with an inverted form of the Napier "Lion" engine. If an inverted engine can be made successful it will be possible to improve the pilot's forward view and also lead away the exhaust more satisfactorily than with the ordinary upright engine.

Research work is proceeding on the connecting-rod big-end loading question. What may be termed the "neck of the bottle" is at present the deformation of these bearings when forces acting in more than one direction are allowed to operate.

One of the most promising events of the past year has been development and use at the R.A.E. of a single cylinder of aero-engine type to run on a "Diesel cycle." With a special shape of nozzle and "solid injection" of shale oil a B.M.E.P. of 112 lbs. per square inch is obtainable with an engine speed of 1,000 revolutions per minute. The fuel consumption was 0.415 lbs. per B.H.P. hour. As this fuel costs about 1-9th of the cost of petrol, this development may have an enormously important effect on the future of aviation.

Work on direct fuel injection is being undertaken also by Beardmore's. They are making initial tests on a single-cylinder with a view to the adoption of the system on a six-cylinder vertical engine The method of injection is different from that employed at Farnborough. In the latter, oil at from 3,000 to 4,000 lbs. per square inch is admitted through a timed valve, whereas in the Beardmore system the oil is injected by a jerk-pump. It is really better not to refer to these cycles as "Diesel" cycles; the nomenclature approved of the Institution of Mechanical Engineers is to call them "compression ignition engines," the ordinary type being called electrical ignition engines. The type formerly termed semi-Diesel becomes the surface ignition engine.

A step forward in full-scale experiment has been made by the perfection of an instrument by which an aero-engine can be tested in flight with an accuracy equal to that of the laboratory. This is the Callendar Electric Air Flowmeter which, attached to the air intake of any engine, measures the weight of air used. The instrument has been thoroughly tested on Siddeley "Puma" engines on the bench and in a D.H.9 machine. The bench tests showed that the air consumption was very closely proportional to the I.H.P. and observations made during flight, climbing and level at various heights up to 14,000 ft. showed that the air consumption and I.H.P. for this engine was proportional to the density of the air.

Efforts are being made to improve the magneto. As a result is is hoped to arrive at a design for a universal magneto equally suitable for all aircraft engines and all conditions of normal air operation.

Aeroplanes

One of the most difficult problems is the association of a low landing speed with a high maximum. Speeds of from 55 to 60 miles per hour are suitable when landing on properly prepared aerodromes but are far too high for safety during emergency landings. Both in civil and in service flying such emergencies do arise, and it is very desirable that a landing speed of not more than 40 miles per hour should be achieved.

As regards very high-speed machines, this is not of necessity accompanied by a lowering of the factor of safety; for instance, in the case of the well-known "Bamel" the factor of safety is as high as six. Very rapid progress is being made in the development of the high-speed aeroplane.

In the study of aerodynamics, attention has been focussed upon improvements in control at low speeds. We hope to find means of providing complete control of the aeroplane in the stalled state. Experiments may lead to a manœuvre of "stalled landing," which, on account of the steepness of the glide when stalled and the low forward speed, may make landings possible in more confined places. Various systems of lateral control are being tried but the greatest improvement has been obtained by the use of a very large rudder. An aeroplane has glided steadily under good control at an angle of incidence of 40 degs. A system of varying aileron gearing due to Mr. Hagg and the De Havilland Aeroplane Co. shows promise of improving the lateral control. The subject is being attacked from both sides—increasing the power of the controls and reducing the tendency of the aeroplane to get out of control.

An hydraulic servo-motor is being provided to operate the three controls of the large seaplanes under test. This motor reduces the effort demanded of the pilot while retaining the "feel" of the control. An experimental model has been thoroughly tested and given good results.

The programme of full-scale and wind-channel tests designed to explore the correspondence of wind-channel measurements with the full scale has been completed so far as it relates to the common form of biplane design, and will be extended to cover thick wings and slotted wings. Apparatus has been designed which it is hoped will render performance tests independent of up or down currents in the air.

The proposal to use airscrews in close tandem form (advanced by Capt. G. T. R. Hill at the last Air Conference) is being investigated by running two airscrews in this manner on the ground.

A certain amount of work has been done with helicopters and it is hoped that the time and effort expended will be repaid.

Metal Airscrews.

Considerable progress has been made in the development of the metal airscrew. It may almost be said now that it has proved itself to be satisfactory for replacing the wooden type. The main difficulty is not so much a question of actual design as a question of finding out how to make it. This difficulty is now overcome.

The airscrew required for engines of 600 to 1,000 h.p. is so large that transportation is a serious problem, and such screws must have detachable blades. The design of a wooden detachable blade is very difficult, the metal screw is normally so made.

The variable pitch screw follows naturally the development of the metal screw. In all variable pitch screws hitherto made the principal difficulty has been to secure adequate attachment for a wood blade to a metal centre. With the advent of the metal propeller this difficulty has been removed. In the ensuing year a considerable amount of experimentation will be carried out with variable pitch airscrews in order to meet the demands of the supercharged engines now being designed and built.

Undercarriages.

The difficulties experienced in the use of aircraft in tropical climates have shown the weakness of rubber as an aircraft material. During the year a large amount of research has been carried out on oleo undercarriages. The oleo undercarriage was first developed with a dashpot and rubber-tension shock absorber. These undercarriages have proved a marked advance on the ordinary type, but the use of rubber in tension in exposed parts of the aeroplane is undesirable.

Four types of undercarriages have been developed: (1) An oleo dashpot combined with rubber in compression; (2) an oleo dashpot combined with a steel spring in compression; (3) an oleo dashpot combined with compressed air; (4) a steel-spring undercarriage with a variable leverage device.

So far the oleo with compressed rubber has proved entirely satisfactory. The oleo with a steel spring has so far proved to be too heavy. If it were possible to obtain a spring made of steel tube, it would be possible to reduce the weight sufficiently to enable this type to become a practical device. Experience of the oleo undercarriage with compressed air is limited. Rather high air-pressures are required and leakage is considerable. The high pressure involves carrying a high-pressure air-pump on the aeroplane.

A new form of tail-skid is urgently required. Failures are very frequent, and the life is very short indeed. Some forms of oleo tail-skids and steel spring tail-skids have been devised.

Metal wheels are being investigated with the object of eliminating rubber tyres and taking all shocks on the oleo mechanism.

Variable Camber Gears.

Efforts are being made to increase the useful weight carried by aeroplanes. In pursuance of this research and experiment are being carried out with a number of variable camber de-

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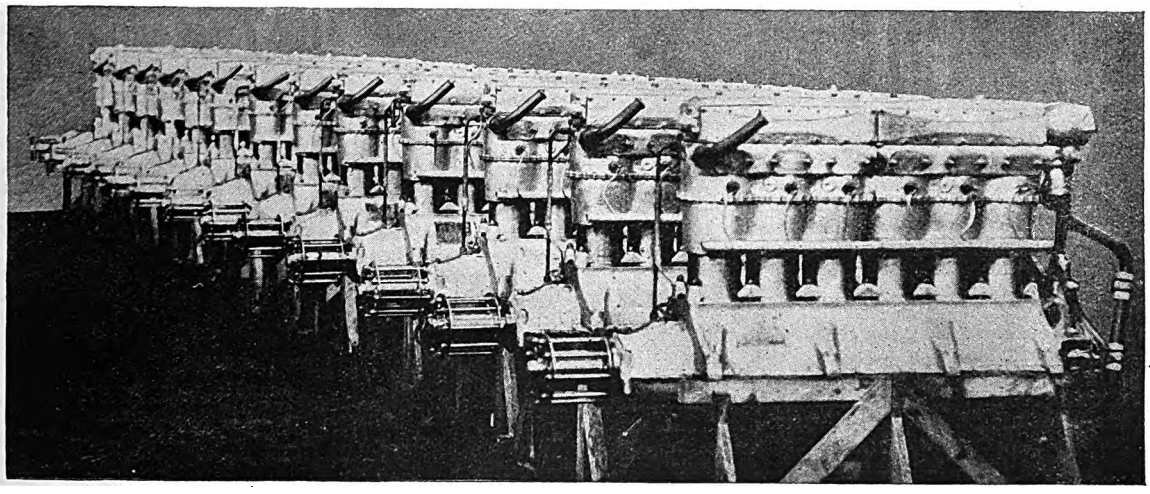

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vices. These divide themselves into: (1) The ordinary aerofoil fitted with an adjustable flap at the trailing edge; (2) the ordinary aerofoil fitted with an adjustable trailing and leading edge; (3) true variable camber gears which vary the actual camber of the aerofoil; (4) devices such as the Handley Page slot which fundamentally affect the air-flow over the planes; and (5) combinations of the Handley Page slot with the trailing edge flap.

Some measure of success has been achieved. With regard to the Handley Page slot, the position at the moment is that it has been demonstrated that this device gives an increase of lift of considerable magnitude, accompanied by a considerable increase in drag. It is believed that this drag can be much reduced.

With regard to the trailing-edge flap, full-scale tests at Martlesham Heath have demonstrated that the trailing-edge flap will reduce the landing speed by approximately 12 per cent. This is an advantage of considerable importance and should be of great value to transport companies.

The other types mentioned are under test or about to be put under test in the wind tunnel. Further development of these will depend on the results.

Metal Construction.

The metal aeroplane is now quite practical. Much is still to be done in cost reduction. It is proposed to simplify design with a view to a metal aeroplane which can be made at a reasonable commercial price and in reasonable quantities. Experience has shown that not only is the metal aeroplane more durable than the wooden aeroplane, but that moderate-sized aeroplanes can be made lighter in metal than in wood. It is believed that this advantage can be continued in larger aeroplanes and that the problem of producing a large aeroplane will be much simplified.

Gliders and Gliding.

The possibilities of gliding are important. It may greatly reduce expenditure of time and money in teaching flying; half- or third-scale models may be tried in the air, so obtaining results closer to those applicable to the full-scale machine than can be expected from a toy model in a wind channel. Further it may add, in ways that cannot as yet be foreseen, to our knowledge of the nature of that atmospheric turbulence which Mr. G. I. Taylor has shown to be present in a normal wind and the possibility of drawing upon the kinetic energy of such movement as a source of power.

It will be remembered that in Hankin's book on the soaring of birds over the Indian plains a suggestion was made that the birds were able to draw upon some then unknown source of power. I remember that on one occasion seeing some kites circling at a great height I took my machine to a point some thousands of feet below the circling birds and found at once that I was in a rising current. One must not, however, ignore the theories that the eddy motions which accompany a wind have a considerable kinetic energy which if tapped would explain the soaring of birds, on the one hand, and afford, on the other, a possible means of power-supply for gliders.

Navigation and Instruments.

Compasses have shown that the optimum condition is obtained by the partial adoption of the periodic principle together with a modified adoption of R.A.E. developments. An alternative kind of magnetic compass known as the Inductor Compass has been tried by the U.S. Government. In this a little generator, the armature of which revolves in the earth's horizontal magnetic field, produces a minute electric current which by ingenious mechanical arrangements is arranged to indicate to a pilot whether he is flying to port or starboard of a course previously laid down. A device of this kind lends itself to "repeater" work and it is being carefully watched. Should steel construction in modern aircraft render the ordinary compass impossible such a device as this might prove useful.

The most successful compass for ship use is the gyroscopic compass. The problem of the development of this compass for use in the air is very difficult and it cannot be said that success is within sight.

An important problem is the provision of means whereby the pilot of a single-seater machine can obtain in flight a sufficiently accurate knowledge of the velocity and direction of the wind to enable him to lay his course correctly. A method is under consideration whereby the pilot on any course when over a conspicuous ground-mark starts a stop-watch. The course is held for a short time and the machine then turned rapidly onto the reciprocal course and so held for an equal interval of time. At the termination of the second interval the machine can be headed for the original ground-mark and will then be flying up-wind. The course steered gives the direction from which the wind is blowing and the time taken on this third course divided by the total time of observation gives the ratio of wind velocity to air-speed. There is at the same time under trial a method by which pilots can measure the apparent drift of the ground by means of a scale of angles marked on one or other of the lower wings.

With the ever-increasing radius of action of civilian aircraft comes the question of the accuracy with which these distances can be navigated. The pilot is liable to be required to fly over desert and sea, and he should be prepared to take advantage of favourable winds and conditions which may prevail above clouds, and to fly for several hours on a correct course without viewing land. Either Directional Wireless or Astronomical Observations can be used. The latter necessitates accurate observation and facile reduction; the main problem is to determine, by day or night, the altitude above the horizon of some heavenly body. A sextant which experience has shown to be capable of being employed under air conditions is the R.A.E. Bubble Sextant. This instrument refers the altitude of a heavenly body to a gravity-controlled bubble. The only error of importance to which the instrument is subject is due to horizontal accelerations resulting in a movement of the "apparent vertical." A large number of sextant observations analysed by Prof. B. M. Jones show that the size of the errors depends upon the state of the atmosphere. A mean of six observations with the instrument will give position to within 4.7 miles in no bumps, and to within 9 miles in obvious bumps.

Fog Landing.

The problem of landing in a fog is one of the most troublesome which we have to face. At present an aircraft can be led to within approximately two miles of an aerodrome by Directional Wireless. When the aircraft is within this radius, further position finding becomes difficult owing to the time required to take the bearings and to transmit the information back to the aircraft. A scheme is being tried at Croydon whereby the position is taken by acoustic methods and then transmitted to the aeroplane by wireless. This relieves the pilot of the necessity for asking for his position when he is much occupied with flying the machine, and the lapse of time between taking his position and giving him the information is reduced. By these and other means (such as rockets) a pilot can locate the aerodrome, but the problem of landing through the fog remains.

We are now investigating the possibility of laying a cable round the aerodrome. The cable will carry electrical current and the aeroplane will carry apparatus capable of detecting it and of measuring the energy received. The amount of such energy gives an inverse measure of the height. By this means it is hoped to enable the pilot to locate the confines of the ground and to glide down with an accurate knowledge of his height at any given moment.

Aerial Surveying.

The value of aerial survey is dependent upon the accuracy with which the camera can be held vertical and at a known constant height. To determine the probable degree of accuracy a series of experiments has been carried out by Prof. B. M. Jones and Major J. C. Griffiths.

The progress of aerial photography may be gauged from the fact that in 1914 it was barely possible to identify men in photographs taken from 3,000 ft., whereas photographs have now been taken from 8,000 ft. in which it is possible to distinguish birds feeding on the ground.

Wireless.

Progress is being made in fixed wireless aerials, the advantages as compared with trailing aerials being considerable. Such aerials are operative even when an aircraft is taxi-ing and will facilitate "position finding" under conditions of very low visibility, and also fog landing, when a trailing aerial could not be used.

Progress in our knowledge of Directional Wireless continues. The plains of the Middle East are proving ideal for this work, the errors in bearings from natural causes being negligible. Stranded aircraft can, therefore, be located with confidence.

The abolition of accumulators in aircraft on account of their weight has received much thought during the past year. The two main difficulties are to drive wind-driven generators at constant revolutions irrespective of the air-speed of the aircraft and to provide a source of electric supply to aircraft when stranded. These problems are well on the way to solution.

Materials.

The essential difference between the work of designing aircraft and of other engineering structures lies in the extreme need in the former to work to an exceedingly close weight limit. This demands a correspondingly closer study of fatigue limits in the materials employed. This essential study becomes of quite vital consequence in parts subjected to alternating stresses. Research work on the fatigue problem is in hand at the Universities of Oxford, Birmingham, Edinburgh, Liverpool, at the Greenwich Naval College and at the N.P.L. and R.A.E. An important detail, the failure of which is all too common, is the engine valve spring. A research

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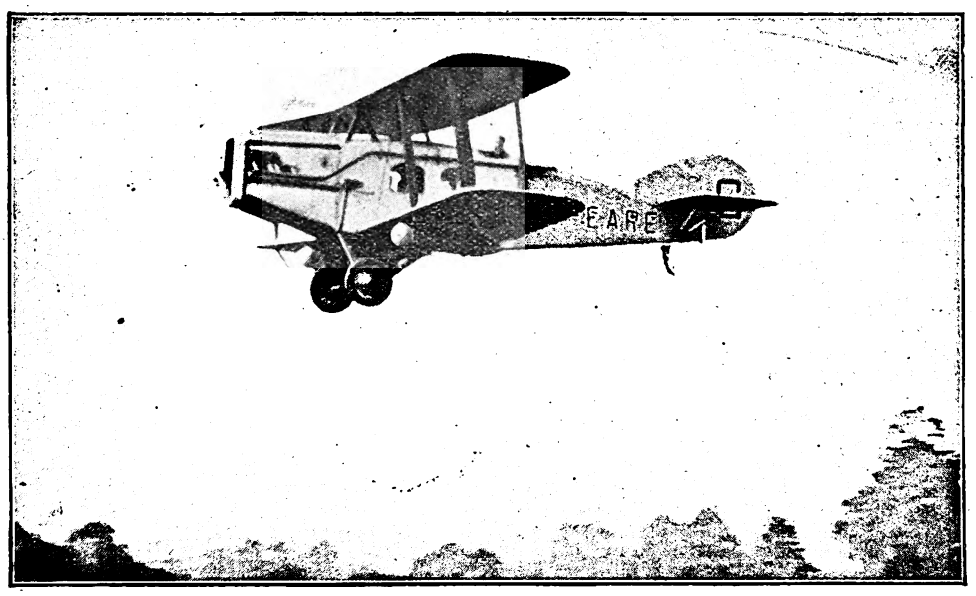

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is accordingly in hand to ascertain the nature of the right limits of stress for such parts.

Research work in fatigue has been mainly carried out on steel samples, but as a control experiment tests have been made on the simpler material, nickel; these have most remarkable results. During fatigue tests on a specimen of nickel, definite "heat bursts" occurred at definite loadings, but did not recur when the test was repeated on the same sample. Prof. Jenkin of Oxford has made a careful study of the bearings of this and of other similar phenomena: as a consequence he has been led to a definite theory of the nature of the stress effects on a mass of crystals. A large-scale model illustrative of this theory has been constructed and put under test. The model is surprisingly simple, with it nevertheless almost all known phenomena in the fatigue of metals can be reproduced. The work is in some ways analogous to that leading to Ewing's famous magnetic models and promises to be equally important as an advance in scientific knowledge. To aeronautical design it may well prove to be no less important.

The use of light alloys—such as duralumin—for aircraft equipment requires the development of a satisfactory preservative against corrosion. Assistance has been received in this direction from the Imperial College of Science where Dr. Bengough has developed the very promising anodic oxidisation process. Other workers are also engaged on similar research.

Inspection Methods.

Great difficulty has been experienced in obtaining steel suitable for the stampings and forgings for engine parts such as connecting-rods, crankshafts, etc. The stampings required for the modern engine are difficult propositions, and steel of absolute soundness and practically free from inclusions is necessary to withstand the severe treatment given during the stamping and heat treatment operations.

A considerable amount of work has been done on the production of alloy steel strip for all-metal construction. The strip is supplied heat-treated, and is drawn, rolled, or formed in this condition. Further research is necessary to determine the physical constants for such strip, and also in developing alloys generally suitable for all-metal construction.

Attention is being given to the drop-forging and die-casting of large pistons, crankcase parts and so on. Results obtained with high-silicon alloys, providing close texture and greater freedom from casting cracks, are promising.

The serious internal corrosion of engines held in store has been eliminated to a large extent by running them with a heavy mineral-oil lubricant for a few minutes on completion of the ordinary test, and turning them every two or three months at a sufficient speed to redistribute the oil.

Advantage has been taken of recently gained knowledge of the essential qualities and properties of fuels. In the new petrol specifications issued by the Ministry chief consideration has been given to the aromatic content of the spirit rather than to its specific gravity. Further steps in this direction, however, must await the complete disappearance of rubber jointing, owing to the rapidly deleterious effect of aromatic fuels on such connections.

Experience gained on the reinspection of tanks, radiators and other components in which soldering is employed has shown that the question of soldering fluxes requires research. Investigation has shown that corrosion is primarily due to the presence of free zinc chloride. Washing in hot water is required to remove the salt. Free acid is also a cause of corrosion—this may be detected by methyl-orange.

The development of the metal airscrew which is dependent upon welding during its manufacture has called for research to ensure the reliability of the welded joint. This has only been achieved by the extension of laboratory methods into the shops, namely, the control of each welded propeller by means of micro-photographs of the welded joint after heat treatment. Research has also been conducted on the temperature variation in the muffles in which these airscrews are normalised. A great improvement as regards the structure of the material adjacent to the weld has thus been secured.

The application of the spectroscope has been very successful in the examination of metals. The ultra-violet spectra of metals have shown the presence of traces of unsuspected impurities. A sample of electrolytic copper was found to contain magnesium in such small quantities that they escaped detection in the ordinary chemical analysis. The presence of nickel has also been determined by this process.

The use of polarised light has been found to be satisfactory for examining navigation light domes and pulsator glasses for good annealing. Considerable difficulty had been experienced with these glasses owing to their liability to crack spontaneously or on the slightest provocation, *e.g.*, vibration, owing to incorrect annealing.

Seaplanes.

A new development took place this year and will be repeated in connection with the practical tests under seagoing conditions of the various types of boat seaplanes produced under the Research programme. Success was achieved as regards moorings and valuable data gained as to seaworthiness. We are inclined to believe that in the important question of float versus boat that there are distinct uses for both, the boat being adapted for large craft and the float for lighter craft.

Steps are now being taken to investigate the possibilities of the metal hull, as we are convinced that true development for very large machines must take place along these lines. The investigation of hull forms is proceeding. Work on these, including hydrovanes, is being carried out by the National Physical Laboratory.

A floating dock has been produced and has proved sufficiently successful to enable us to proceed further.

A Summary of the Main Advances made during the Year.

1. The staff has been reorganised. Nucleus for technical administrative work has been held at Headquarters, the balance of the technical staff being transferred and amalgamated with the Royal Aircraft Establishment staff. Another important change is the bringing in to Headquarters directly under Air Member for Supply and Research of the Secretary of the Aeronautical Research Committee who is granted free access to technical papers; it is hoped that this will facilitate the work of the Aeronautical Research Committee.
2. The metal aeroplane has now passed through the experimental stage and is fit for production.
3. The supercharger has been flown with satisfactory results. Development is rapid.
4. Undercarriages of large shock-absorbing capacity have been made whereby without any appreciable increase in weight it may be possible to glide onto the ground without flattening out and, further, to reduce the risk of damage to the aircraft and crew in bad landing.
5. Fuel injection. Very satisfactory progress although perhaps slow.
6. Multi-engined aircraft. The three-engined machines have been explored and specifications have been prepared.
7. Progress has been made in our knowledge of corrosion of metals and the prevention thereof.
8. Heating and ventilation of civil aircraft.
9. Metal airscrews and variable pitch airscrews.
10. Fire prevention including outboard tanks under the top wing.
11. Delegation of certain stressing work to approved constructors (civil aircraft).
12. The inverted engine.
13. Correlation of wind-channel experiments with full-scale results.
14. Universal magneto.
15. Stalling-speed experiments.
16. Mechanical power for controls.
17. Variable camber gears including slots and adjustable trailing and leading edge.
18. Metal construction of aircraft and of materials for the same.
19. Improvement and initiation of navigational instruments of all types and for aeronautical purposes.
20. Wireless.
21. Aerial Photography and Aerial Survey.
22. Method of inspection established with regard to materials has been standardised.

The Position of Air Transport To-day.

By Major-General Sir W. Sefton Brancker, K.C.B., A.F.C. (Director of Civil Aviation).

The International Commission for Air Navigation.

The International Convention for the Regulation of Aerial Navigation was drawn up under the auspices of the Treaty of Versailles. Its object was to facilitate air transport between States who were signatories to the Convention by the introduction of uniform systems of signals, maps, and for the supply of meteorological information and so forth; also to ensure the proper standard of safety and reliability throughout the air transport activities of those signatories. The Convention was signed by 21 States, but so far has only been ratified by the nine following States: The British Empire, Belgium, Bolivia, France, Greece, Japan, Portugal, Jugo-Slavia, Siam. Persia has also adhered to the Convention since, and is now represented on the Commission.

The Commission first met in Paris last July and it was there decided that it should meet three times a year at the capital of one of the signatories wherever most convenient. Its second session was held in London during October, and its next will be in Brussels at the end of February. An amended wording of Article 5 was drawn up in July, and finally approved at the London meeting in October. By the

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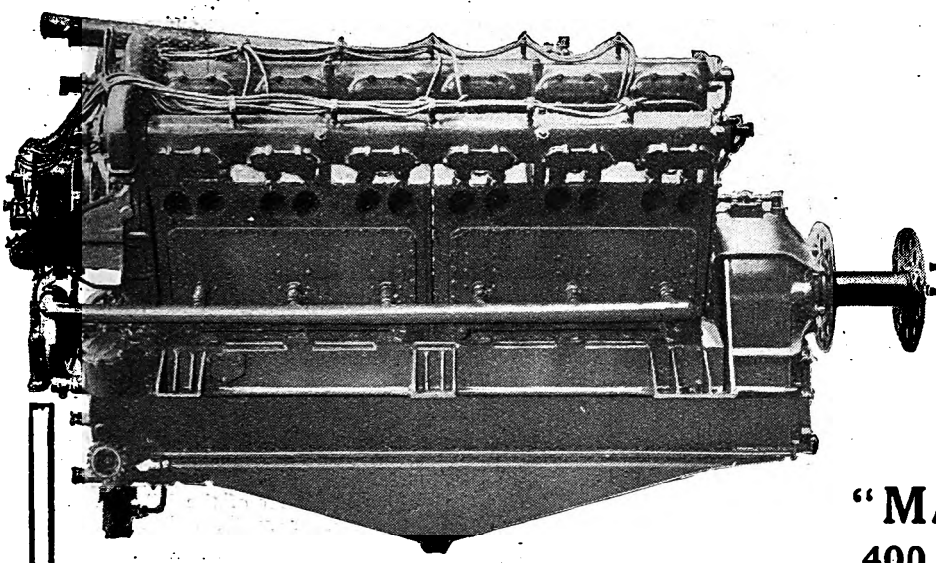

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new Article 5 contracting States have freedom to make agreements with non-contracting States without let or hindrance, so long as these special agreements do not infringe the rights of the contracting States and do not clash with the rules laid down in the Convention or its Annexes.

Under Article 34 the voting power of members of the Commission is such that the five great Allies—France, Italy, the United States, Japan and Great Britain if voting together will always have a majority. The small nations naturally plead that it smacks too much of the Great War and that they cannot agree to the principle of the old Allies always being certain of a majority. It is generally agreed that something must be done to modify Article 34. Actually, the fact that two of the great Allies—the United States and Italy—have not yet ratified makes the assured majority of the great Allies inoperative.

It is of urgent importance for the future of air transport that all nations including our late enemies should sign the International Convention, as it is only by its means that common rules of navigation, lighting, signalling, and other regulations for the safety of aircraft and personnel can be extended throughout the world.

The International Commission has so far been an unqualified success and personally I have very great hopes that it will develop into a strong factor towards maintaining the peace of Europe in the future.

Air Transport During the Past Year.

Subsidised Services.

The new subsidy scheme decided in February, 1922, catered for three rival companies flying to Paris and one company to Brussels. The Daimler Airways Company had risen from the ashes of the old Aircraft Transport and Travel Company and had been approved by the Air Ministry for the Paris route as well as Instone and Handley Page. The Instone Air Line had also been allotted the Brussels route in addition to Paris.

It had three outstanding defects: (1) It fostered undesirable competition between *British* firms; (2) it depended entirely on the volume of traffic obtained and was based on a too optimistic estimate of this traffic; (3) it was too complicated in its application.

About the end of May it was decided by the Air Council that something must be done at once. A scheme of compensation for past losses was first arranged. These losses were the direct result of deficiency in the passenger and goods traffic; so the amount of compensation was calculated on the number of passengers anticipated when the subsidy was drawn up. The increase hoped for was reckoned at 65 per cent. on the traffic of 1921, of which it had been contemplated that 75 per cent. would have been carried by British aircraft.

On this basis, for each passenger less than this number, a grant of £10 17s. 6d. was allowed as representing the amount that could have been received in fare and Government subsidy. This gave us the lump sum which should have been expended on firms if traffic had come up to expectations. This lump sum was divided into two—one-half was divided between the firms in proportion to the number of passengers they had actually carried, and the other half in proportion to the seats they had had available. This sounds rather complicated, but I think it was just and that it met the situation. This scheme of payment was made to apply up to Sept. 30th, during which time a new scheme had to be drawn up and approved by Treasury.

Even this new scheme was perforce of a temporary nature as the money available would only last for about another 18 months. At the end of that period, that is somewhere about the beginning of 1924, most of the £600,000 allocated for the subsidies would have been expended; so the new scheme was only intended to remain in force for the period during which some more far-reaching line of Government policy regarding air transport must be evolved.

This temporary scheme was based on the following desiderata: (1) To preserve the three existing air transport companies, but to prevent them competing amongst themselves; (2) to extend British transport activities as far into Europe as possible with the money available, and to establish at least one internal air route in Great Britain.

After considerable discussion, arbitrary figures were laid down as representing sums just sufficient to cover the probable losses in one year on these four routes—£15,000 for Paris, £25,000 for Cologne, £55,000 for Manchester and Berlin and £10,000 for Cherbourg and the Channel Islands. No more money was available of the unexpended portion of the £600,000 allowed for the current year.

It was also necessary to make some new arrangements regarding the supply of equipment; so the aircraft and engines which we allowed to the companies on the hire-purchase system were given to them outright up to a certain limit in capital value, each company receiving approximately £30,000 worth of equipment.

An offer was also made to furnish capital up to 30 per cent. of the value of any new equipment required by operating companies during the next financial year.

I would like to add here that throughout these negotiations the Treasury were extraordinarily sympathetic, helpful and quick in arriving at a decision on general principles and by their assistance enabled us to bring the new competitive system into force on Oct. 1st.

As Germany is not yet a signatory of the I.C.A.N., by Article 5, as it stands, we cannot make an agreement with her, but, as I have explained above, the International Commission has already decided to modify Article 5, so as to permit agreements with non-signatory States. As soon as ratification of this modification is concluded, we shall have power to make an agreement with Germany permitting us to fly to Berlin and German aircraft to fly to London.

The case of Cologne is more difficult. The Treaty of Versailles and the ordinances and decisions which have been drawn up since its signature forbid German aircraft to work over the occupied area until Germany has joined the International Convention. Germany was invited by the Allied Council of Ambassadors to join the International Convention during the latter part of December. Germany accepted this invitation on conditions that Articles 5 and 34 should be modified in certain respects. I think we can say that Germany is certain to become a member of the I.C.A.N. during the next few months if the Ruhr troubles do not dislocate all international arrangements.

I must mention one other difficulty which lies in our path. Germany, Austria, Hungary and Bulgaria have all accepted certain restrictions on their aeronautical design and organisation under the Treaty of Versailles. These restrictions are known as the "Nine Rules." Amongst other items, these Nine Rules impose certain limitations in speed, climb and useful load, which make it impossible for these countries to employ really efficient commercial aircraft, although, of course, they are only intended to prevent the construction of military aircraft. Germany claims that if these rules are enforced on her, she equally can enforce them against foreign aircraft crossing her frontier. If these Nine Rules are enforced, if Germany's threat holds good, and if her old Allies follow her lead, air transport to the East will be very seriously handicapped, as the only route open to our aircraft which does not impose the Nine Rules will then be via Italy and Greece. I believe, however, that the Germans are putting forward some suggested modifications to these rules, which it may be hoped will remove this direct handicap on international air transport.

From October, 1921, to October, 1922, 621,725 miles were flown. From October 1st, 1922, to October, 1923, 637,846 miles is the *minimum demanded* and probably considerably more will be flown. 1,350 miles of air routes are to be covered instead of 420 miles and this may be raised to 1,500-1,600.

Unsubsidised Undertakings.

There are two other organisations which deserve special mention—the De Havilland taxi service and the Savage Sky-Writing Company. Neither are helped in any way by Government, and both have done a lot of work and made both ends meet financially.

The De Havilland Service have flown the length and breadth of Europe without a single accident to pilot or passenger. During 1922 they have flown 126,000 miles in 1,400 hours. 37 per cent. of this had been newspaper and cinema work, 33 per cent. taxi work, 18 per cent. aerial photography and 12 per cent. teaching. The charge made for a 250 h.p. machine carrying 3 passengers is 2s. 6d. per mile, and this I believe is to be reduced to 2s., which, I think you will agree, proves that air transport is already beginning to compare quite favourably with road transport.

The Savage Sky-Writing Company has been working in various parts of England and France, and has now sent an expedition to America. It is equipped with the old S.E.5. The nature of the work demands very fine piloting at high altitudes and should provide excellent training for fighting in the air. The Company now have 12 S.E.5as in commission and have employed 16 pilots.

Various small joy-riding organisations are still in existence, notably the Surrey Flying Services and the Berkshire Aviation Company. The flying hours accomplished by these enterprises are considerably less than they were in the years immediately after the War, 22,000 as compared with 36,000 and 37,000 in 1920 and 1921. I think that this is due rather to the amount of money that was lost in those early days than to any lack of interest on the part of the public.

The King's Cup.

His Majesty the King has given us a great incentive by presenting the King's Cup to be competed for annually. The first race for this Cup took the form of a handicap round England and Scotland, and was flown during September last. This race was an unqualified success. There were 21 starters and not one single accident.

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Perhaps the best sporting feat accomplished by British aircraft during 1922 was the winning of the Schneider Cup by the Supermarine Company with one of their flying boats fitted with a Napier "Lion" engine.

It is obvious that the promotion of racing is of distinct national value; it encourages the designer to unceasing efforts towards increasing speed, a quality which is invaluable in the fighting machine.

We were the first nation to fly as far as Australia and South Africa; we were the first nation to fly across the Atlantic; and to-day we are certainly going to try to be the first nation to fly round the World. Already one British expedition started off on this great adventure in May 1922, but it was a case of more haste, less speed. The expedition was hastily conceived and was not too well organised, and so I am afraid did not do much good to the cause owing to the very long time it took to reach Calcutta.

To-day, however, we have no less than five different groups of pilots who are thinking out schemes for this magnificent effort. If it is not done this year, I think it ought to be done next. In any case the Air Ministry are all out to help in every way possible any expedition which can prove that it is soundly organised.

General Résumé of British Progress in Europe.

There have been *no fatal accidents to passengers* on regular British air routes during 1922; only one passenger was slightly injured in a collision on the ground; beyond this there were six minor accidents in none of which anyone was hurt. No paying passengers were either killed or injured on joy-rides. During the year the regular subsidised services carried about 10,100 passengers and 22,200 flew on joy-riding flights. I think we can fairly say that the results of 1922 point to air transport being a safe means of progress if properly organised and properly administered

Reliability is more difficult to assess, but I can give you one set of figures which point to progress. During 1920, 1,869 flights were commenced by British machines on the London-Paris route, 80 per cent. of these were completed within 4 hours; during 1921, 1,926 flights were commenced, and 89 per cent. of them were completed within 4 hours; in 1922, 2,055 flights were commenced, and 92 per cent. of them were completed within 4 hours. It must be remembered that these flights covered all the worst part of the winter and that the percentage of reliability during the summer months was very much higher.

Engine failure is rapidly vanishing. During September, October and November, in 1,414 flights there were only 4 cases on the subsidised route across the Channel.

The next point of interest is our progress towards economical running. In 1921 the maximum number of British aircraft employed on the cross-Channel services was 13 during August; and each of these 13 machines did 32 cross-Channel flights during that month. In 1922, during the same month of August, 24 machines were being operated, but they carried out double the number of flights, each *averaging 25 flights per month.*

One machine, a D.H.34, EBBS operated by Daimler Airways, flew on 127 days out of 165, covering a total of 80,000 miles. That aircraft is still running and completed about 108,000 miles in the 9 months since April 13th without overhaul, which works out to about 135,000 miles or 1,500 hours a year. This aircraft has not been fully worked and I believe we can get 2,000 hours a year from one machine with good organisation and heavy traffic.

We are also progressing in the amount of flying done by pilots. In 1921 it was generally considered that a pilot could not be expected to fly more than about 400 hours in the year. On the experience of 1922 I am inclined to think that a pilot can fly 600 hours in the year quite easily. In July last one firm's pilots averaged 62 hours' flying each, and 8 pilots who have been flying regularly during the 6 months June to November averaged 48 hours a month each without any ill effect.

The increase of traffic carried on the London-Paris route, which is the only route of which we have statistics for more than one year, is disappointing. In 1920, 6,283 passengers crossed the Channel, and in 1921, 10,731. Actually, only 12,363 crossed the Channel during 1922.

The reasons for this, I think, are threefold (1) The two unfortunate accidents I mentioned earlier took place just as the services were getting into their swing for the summer. (2) The weather in the earlier part of the year was exceptionally bad; and (3) there had been a general financial depression in America and Great Britain.

Out of the total 12,000 odd, 6,600 were aliens and 5,500 were British and most of the aliens were American. During 1921 British aircraft carried only 49 per cent. of these passengers; during 1922 we carried 76 per cent.

A satisfactory feature of the traffic is the increase in the carriage of mails, newspapers, parcels and excess luggage. During 1922, 208.6 tons were carried, which gives an average of 19 tons a month. During 1921, only 19.4 tons were carried during the whole year.

Considerably more flying on the regular routes took place in 1922 than during the previous year, the figures being 632,000 miles as opposed to 221,000 in 1921.

General Progress of Air Transport Ouside the British Empire.

During 1922 France had 13 air routes in operation, as against 8 in 1921, covering a total length of 5,300 miles as against 3,430 in 1921, and were scheduled to fly about 2,226,000 miles in the year.

The proposed French vote for civil aviation for 1923 totals 155¾ million francs; this includes the technical department which serves the military side of aviation as well as the civil. About 47¾ million francs are devoted to direct subsidies; it is difficult to gauge the exact value of this sum in sterling, but I should put it at almost £1,000,000 when the local buying power of the franc is considered.

Germany also carried out a lot of flying during the summer of 1922. It is German policy to shut down all lines during the winter because they have so little equipment that they cannot carry out extensive air services throughout the year. During the summer of 1922, the Germans were operating 15 air routes as against 7 in 1921 covering a length of about 3,980 miles as against 1,695 in 1921, and her aircraft were scheduled to fly about 1,030,000 miles as against 615,000.

The most remarkable German line is that which has been opened from Koenigsberg to Moscow, and which is being run during the winter. The company operating it is a combination between German and Russian interests. It has a monopoly of air transport in Russia and a guarantee as to profits from the Soviet Government. It runs twice a week and by it the journey between Berlin and Moscow now only takes 22 hours as opposed to 5 days by ordinary means. The aircraft used on this route are Fokker monoplanes fitted with Rolls-Royce "Eagle" engines.

In America there is a great deal of private joy-riding going on, but there is no Federal legislation and no controlling authority for civil aviation. There is, however, a very interesting air service being run by the Post Office. It is operating regularly every day between New York and San Francisco, the journey taking approximately 56 hours. The service has so far been run over a section by air by day, and then by night by train and then another section by air on the following day, but it is now intended to fly right through, and one section of the route between Chicago and Cheyenne is being organised for a night service.

During 1922, a total of 175,000,000 miles [?—Ed.] were flown on this route, and about 49,000,000 pieces of mail were carried. Letters go by air service as a matter of course and the public are not charged anything extra

[One may add that the machines used are chiefly American-built modified De Havillands.—Ed.]

The Dutch are running a very efficient service between Amsterdam and London. It is supported by Government. They are using Fokker monoplanes with British Siddeley "Puma" engines and the standard of their regularity and safety in running and general efficiency is very high; I have always maintained that the Dutchman is going to make one of the best air pilots in the world, just as he was one of the finest sailors in the old days and I think this initial service bears me out.

In Belgium a new company has been formed in which the Government will have considerable interests, for the operation of air transport in Europe. It is not clear when this company will start operations. In the Belgian Congo seaplanes have been operating (with considerable success) following the Congo river from Leopoldville to Stanleyville, a distance of 1,077 miles.

Spain has already for some time been running an aeroplane service between Seville and El Arish in Morocco. This service up-to-date has been equipped with British machines (de Havillands) and been manned by British pilots, and it has been remarkable for its regularity.

Air Transport in our Overseas Dominions.

Australia leads the way. She has organised two long air-routes, one from Geraldton to Derby—1,200 miles—and another from Charleville to Cloncurry—580 miles. The Geraldton-Derby service runs weekly with Bristol Tourers which carry only two passengers. During the first 9 months of their operations they attained to 97 per cent. efficiency; during the last four, 100 per cent. No accidents have occurred and the time saved over other methods of travel is 9 days. Letters are carried for a 3d. surcharge and have averaged a little over 1,100 a trip. The annual Government subsidy to this service is £25,000. The Company has issued a dividend of 10 per cent. and has laid by more profits as a reserve.

Two more routes are being organised—Adelaide to Sydney, about 1,050 miles, and Sydney to Brisbane, about 500 miles at a total cost of £29,000 more.

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On August 7th, for the second time in succession, B.T.H. Magnetos helped Mr. J. H. James to secure the Aerial Derby Trophy for First Place.

His machine—"Mars I"—The Gloucestershire Aircraft Company's biplane, popularly known as the "Bamel," has a 450 H.P. Napier Lion engine, equipped with a **B.T.H. A.V. 12 Magneto** and this year averaged 179½ m.p.h., being 16 m.p.h. better than last year.

B.T.H. Magneto Successes.

Second Place was gained by Mr. R. A. de H. Haig, flying a Bristol Bullet machine, equipped with a 440 H.P. Bristol Jupiter engine and a **B.T.H. A.V. 9 Magneto.**

Third Place was secured by Mr. F. P. Raynham, in a Martinsyde F. 6 machine, equipped with a 200 H.P. Wolseley Viper engine and a **B.T.H. A.V. 8 Magneto.**

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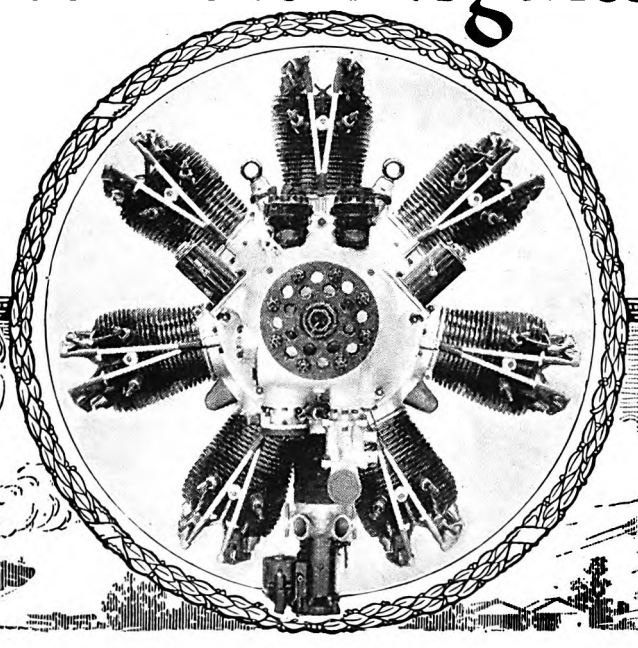

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A few statistics concerning Australia are of interest :—

The grant for civil aviation during 1922 was £159,500, including £88,000 for direct subsidies and £56,000 on aerodromes. There are 20 Government aerodromes, and 33 Government emergency landing places, and 10 private aerodromes in Australia—and at present there are 42 licensed pilots and 78 ground engineers. They only want up-to-date aircraft to make air transport a great success without much financial assistance. Australia is an example of the advantages to air transport of bad communications and a good climate.

In New Zealand a subsidy has been given to three companies on the basis of payment for pilots, aircraft, aerodromes, etc. In this year ending March 1922, 69,000 miles were flown and about 9,400 passengers carried; I expect that this was mostly joy-riding.

In Canada private enterprise has done very little, but the Government have accomplished a great deal of most useful forest survey and fire patrol work, whereby a vast amount of time and a great deal of money has been saved.

In South Africa and India practically nothing has been done because there has been no money to spend.

In Newfoundland efforts have been made towards survey and reconnaissance for seals, but not much has been accomplished so far.

The Cairo-Baghdad service is being run by the Royal Air Force. During 1922 it completed one year's operations. It flew a fortnightly service between Cairo and Baghdad, scheduled for two days, but actually during bad weather taking three or four days. The number of letters carried has steadily increased from a little over 10,000 during the first quarter up to 50,000 in the last quarter. This does not sound much, but it must be remembered that the total bulk of mail is very small and that actually 28 per cent. of the inward mail and 19 per cent. of the outward mail has been carried by air. During the first quarter an average of 14 days was saved on each trip over the ordinary methods of communications; during the fourth quarter this average saving was increased to 18 days and at one time it has risen as high as 19 days.

Airships.

The Government offer of May 1921, lapsed some time ago, but the material has been preserved in case the Burney Scheme came into operation. The airships which still exist are R.36—a service airship converted for commercial work. She is fitted with comfortable cabins and carries 50 passengers, with a fuel endurance of about 50 hours. R.33, built for war purposes, and a sister ship to R.34, which flew across the Atlantic. R.80, a small ship which would be useful for training purposes—the American crew of the ill-fated R.38 was trained in her. L.51, a 1918 Zeppelin with great speed and climb, but probably too lightly constructed for commercial work. R.37, a sister ship to R.36, which is about 90 per cent. completed. These ships are all stored at Cardington and Pulham. In addition, there is a considerable quantity of airship stores of all descriptions, including engines, at these two stations. The only tangible offer before the Government at the present time is that of Commander Burney, who wishes to form a company with a capital of £4,500,000 with a view to organising a bi-weekly service to India with a weekly extension to Australia. This scheme involves the construction of 9 airships of the very latest German design. New sheds would be required at home, in India and in Australia, for the overhaul of these ships, whilst mooring masts would have to be provided in England, Egypt, India, Rangoon, Singapore and Australia.

Foreign Powers generally are doing more than we are with airships. America has a large Zeppelin under construction at Lake Hurst and others being built by the Zeppelin Company at Friedrichshafen; both these ships are about 2½ million cubic feet capacity, and are, I believe, intended for trans-Atlantic service and are of the very latest type.

France has two Zeppelins taken over from the Germans but, owing to lack of money, is making practically no use of them. She is, however, constructing some very large sheds just outside Paris and near Marseilles. The Paris sheds are two in number and are 984 feet long, big enough to house a five million cubic foot ship. Germany is not allowed to build any ship above 10,000 cubic metres under the Treaty of Versailles. She is, however, keeping her technical staff employed on the ship which is being built for America, and has been endeavouring to get orders in Spain, Portugal and elsewhere.

Spain is seriously contemplating a combined Spanish-Argentine service running from Seville to Buenos Aires. Italy is doing practically nothing. Beyond this there are no airship activities.

Thereafter General Brancker dealt faithfully to his own satisfaction with certain critics (including himself) at last year's Conference. And he made some remarks concerning the Civil Aviation Advisory Board, which seems to have done nothing in particular. Continuing he said :—

Relation Between Civil and Military Aviation.

Military and civil aviation are not rivals. This last year we have made very distinct progress towards a state of absolute co-operation. The Air Staff have agreed to a scheme of training reserve pilots at civilian flying schools, and are collaborating in another scheme where it is hoped that a definite annual bonus will be given by the Royal Air Force for the upkeep of engines of certain approved types in civil organisations.

The civilian training school system is about to come into operation. Treasury sanction has been obtained for a grant for the retraining of war pilots, in order to fit them for apointment to the Reserve, and for the periodic training of Reserve pilots in the future. As a start, four civilian schools at the works of four of our leading aircraft manufacturers are to be organised in different parts of England and Scotland, and arrangements are being made whereby war pilots can be given from 15 to 25 hours in the air to get them back to flying condition. After that those who qualify for the Reserve, and short service officers from the R.A.F. who join the Reserve, will receive periodic training—either during one period in the year, or over a long week-end every quarter.

The other proposal to grant a bonus for approved engines is still in its infancy, but it offers such obvious advantages from the financial point of view that there is little doubt that it will reach fruition during this year.

Another slight step in advance that we have made is to institute a system of calling for tenders for experimental air transport machines on exactly the same lines as are followed in the case of military machines. Specifications for three different types are being drawn up, and will shortly be issued to all designers.

Thereafter General Brancker dealt with "The Future" in his usual intelligent and enthusiastic manner. As most of us have enough difficulty in making both ends meet in the Present there seems little profit at the moment in looking so far ahead as does General Brancker so one proposes to leave his prophecies to the non-technical news-sheets.

A CELEBRATION OF SUCCESS.

On January 31st the Directors of the De Havilland Aircraft Co. Ltd. celebrated the end of the firm's second financial year by holding their First Annual Dinner, the guests being the pilots and staff of the Company and a few honoured guests including, as Mr. A. E. Turner, the Chairman, remarked, representatives of those who helped the firm to get orders, those who gave the firm orders, those who did their best to prevent the firm from getting orders and those who stopped the firm from getting orders, even the last class being among the firm's friends. In justice to the Criterion Restaurant one must place on record the fact that the dinner itself was certainly the best that one has eaten since 1914. From the turtle soup upwards and downwards it would have satisfied even a pre-war Alderman of the City of London.

The Chairman having announced that there would be no speeches naturally everybody demanded that speeches should be made, and whenever anybody else showed any reluctance Mr. Jackson of the Hulton Press, whom the one and only Aerial Darby nicknamed the "*Evening Stand-Up*," was always ready to rise to his feet and say a few kind words while the next man was thinking what to say. Certainly Mr. Jackson has flown as a passenger more than any other living newspaper man and having had experiences with pilots of nineteen nationalities he proclaimed emphatically that the De Havilland machines and the De Havilland pilots were far in advance of those of any other country. Whereupon he was presented as a tribute with all the flowers on the table, amounting to something like 250 tulips and was garlanded from head to foot in smilax.

Col. Bristow gave the gathering his blessing in the best episcopal manner and expressed his faith in Civil Aviation with an emphasis which one has only seen equalled in the Athanasian Creed. Nobody attempted to be in the least serious and nobody produced any statistics, but one gathered quite informally that the De Havilland firm although only founded at the very worst period of the British trade slump has declared a ten per cent. dividend on its capital in each of the two years of its existence so that the opinion hazarded by one of the guests that the dinner was given to spend the firm's profits for the year was obviously untrue.

Altogether it was a thoroughly cheery gathering. Everybody enjoyed themselves thoroughly and the majority of those present kept things going till after midnight. Capt. Geoffrey de Havilland and his technical colleague, Mr. Walker, are now spending a well-earned holiday in the Scilly Isles far away from everything concerned with aircraft, not as the result of the dinner but because they deserve a holiday after two years of extraordinarily hard work. One wishes them and the firm "Many Happy Returns."—C. G. G.

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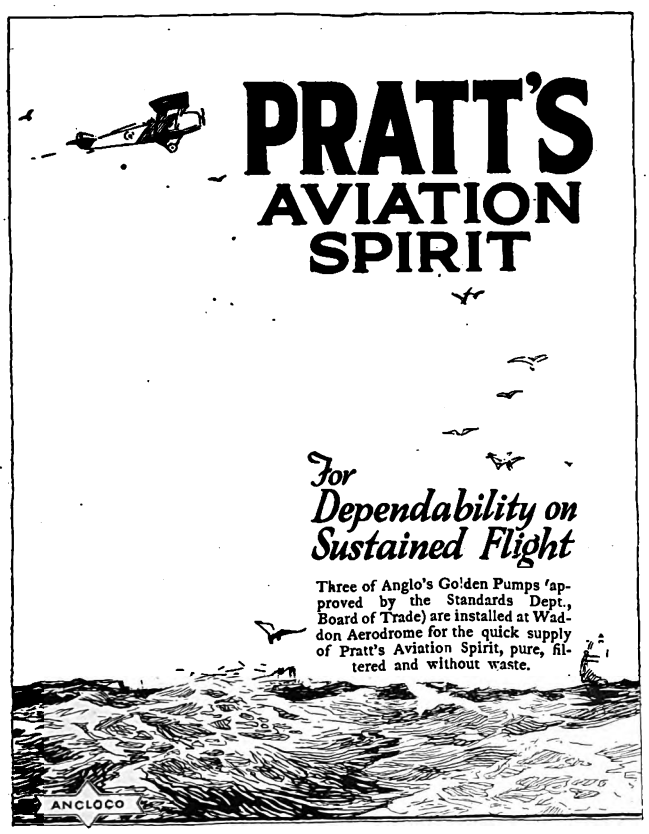
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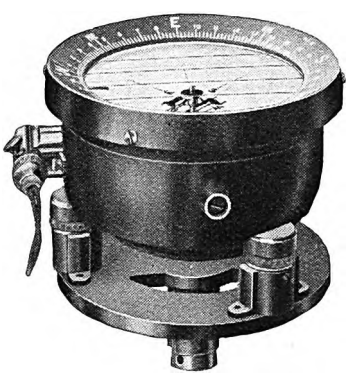

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R.A.F. INTELLIGENCE

Appointments.

Air Ministry, Jan. 31st.

General Duties Branch.—Wing/Cmdrs. E. R. C. Nanson, D.S.C., A.F.C., from No. 4 F.T.S. (M.E.) to R.A.F. Depot (Supernumerary), 8/1; T. O'B. Hubbard, M.C., A.F.C., from R.A.F. Trans-Jordania H.Q. (Palestine Command) to command Palestine Wing H.Q., 22/11; J. R. W Smyth-Pigott, D.S.O., from Aeronautical Committee of Guarantee (British Section), Germany, to R.A.F. Depot (Supernumerary), 23/1.

S/Ldrs. J. Kemper, M.B.E., from No. 4 F.T.S. (M.E.) to H.Q., Iraq Command, 5/1; J. Sowrey, A.F.C., from R.A.F. Cadet College (Ground Wing) (Cranwell) to C.F.S., 29/1; H. G. Smart, O.B.E., D.F.C., from R.A.F. Depot to C.F.S., 4/2; A. J. Capel, from H.Q., R.A.F., Cranwell, to R.A.F. Cadet College, Ground Wing, Cranwell, 29/1.

F/Lts. M. Moore, from H.Q., R.A.F., Middle East, to command Aden Flight, 10/1; J. C. Slessor, M.C., from R.A.F. Depot to Air Ministry (Dept. of C.A.S.) (D.T & S.D.), 1/2; R. H. Hanmer, M.C., from R.A.F. Cadet College, Flying Wing, Cranwell, to H.Q., R.A.F., Cranwell, for duty as Adjutant, 29/1.

Medical Branch.—Wing/Cmdr. J. McIntyre, M.C., M.B., M.A., from H.Q., No. 1 School of T.T. (Boys), Halton, to H.Q., R.A.F., India, 19/1.

F/Lt. W. E. Hodgins, M.B., from H.Q., R.A.F., India, to No. 5 Squadron, India, 23/12.

Air Ministry, Jan. 30th.

General Duties Branch.—F/O. C. H. Stilwell is granted a perm. commn. in the rank stated (August 31st, 1922; F/O. G. Martyn is granted a perm. commn. in the rank stated (Dec. 12th, 1919) (since promoted); the notification in the *Gazette* of Dec 12th, 1919, appointing him to a short service commn. is cancelled

The Mosul Rumour.

The Air Ministry announces that with reference to the Kemalist Communiqué circulated by *Reuter* on Jan. 15th, the Air Council have received a telegram from the Air Officer Commanding, Iraq, stating that the report that British machines bombing near Mosul have been brought down is entirely without foundation.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

The Association Football Cup.

Draw for the Fourth Round.—Winners of Winchester v. Calshot, Netheravon. Duxford v. Cranwell "B."

Winners of Halton "A" and Halton "C" v. Halton "D"; Manston No. 1 Section v. Manston No. 2 Section; Eastchurch v. Isle of Grain.

The following have received byes: Leuchars, Shotwick, Shrewsbury.

4th round to be completed not later than February 21st. Results to be forwarded to the Hon. Sec. by both teams. In the case of replays, these must be played on or before February 24th.

To be played on the ground of the first-named team. Extra time will be played in the case of a draw. Dates of fixtures to be forwarded to F/O. Simmonds, Halton Camp, Hon. Sec. of the R.A.F. Referees Committee, 14 days before the match in order that he may appoint referees.

Hockey.

R.A.F. v. R.E.—The above match was played at Uxbridge on the 31st inst. and resulted in a win for the Engineers by 2—1. The R.A.F. turned out their full team for the first time this season, and considering that it had never played together before, it did extraordinarily well. At the start, the R.E.s had the game well in hand, and pressed continuously for a long time, but the R.A.F. defence was good. After about 25 minutes' play, Hancock scored with a push shot, the R.A.F. goalkeeper's view being obstructed. After that the R.A.F. play improved on the left. Robinson, working hard, made some fine openings, but the ground was too slippery for Sawyer to get away quickly.

At half-time the R.A.F. Selection Committee made some alterations in the places, Saint going centre, Smyth to his old place at left-half, and Scott-Davidson to centre-half. The result did not justify itself to start with, and ten minutes after the start Golden scored a second goal for the Sappers. Gradually the R.A.F. team shook down to their new places, and during the last 20 minutes treated the spectators to as fine a display of hockey as has been seen this season. Saint at centre led the attack very well, while Scott-Davidson at centre-half was by far the best player on the field. The R.E. backs were playing excellently, and so was their goalkeeper, who saved countless good shots. A fine piece of work by Robinson enabled Reeves to open the scoring for the R.A.F. with a good shot.

There is no doubt that with more practice together this team, which is the best side that the R.A.F. have ever produced, would take a lot of beating. The same team will do duty against the Army and the Navy on the 7th and 15th respectively.

R.A.F. Team:—F/Lt. Gilley (Staff College); H/C. Davenport (No. 1 F.T.S.) and P/O. Roupell (No. 2 F.T.S.); Wing/Cmdr. Bromet (S. of N. Co-op.), F/O. Scott-Davidson (Depot) and F/O. Smyth (S.T.S.); F/O. Sawyer (M.A.E.E.), S/Ldr. Robinson (I.A. H.Q.), F/O. Saint (R.A.E.), P/O. Reeves (No. 2 F.T.S.) and P/O. Wiblin (No. 39 Sqdn.).

Stores Depot, Egypt.

Football.—In the 2nd round of the Middle East Cup, the Depot beat No. 47 Squadron by 3—1.

Alexandria and District League Results.—Red Star (lost 0—1); Albion Rovers (lost 1—3); R.A.O.C. (won 1—0); East Yorks Regt. (lost 3—5).

Hockey.—In the Middle East Hockey Competition, the Depot was defeated by No. 4 Flying Training School by 2 goals to 1.

Rugby.—One match, against the Eastern Telegraph Company, has been played, and resulted in a win for the latter by 14 points to 5.

Halton.

A very interesting boxing meeting was held on the evenings of Jan. 22nd and 23rd to choose the station representatives for the Team Championships at Margate. The winners and runners-up in the various weights were respectively:—

Flys.—AC. Mayes and AC. Turton. Bantams.—AC. McKissock and AC. Webster. Feathers.—AC. Davies and AC. Whittaker. Light.—Sgt. Salter and AC. Jackson. Welters.—AC. Bill and AC. Wilkins. Middles.—Sgt. Kerby and AC. Hooker. Light Heavies.—AC. Egginton and AC. Williams. Heavies.—AC. Forrester and Cpl. Barrett.

The number of points scored by the various sections were:—No. 4 (50); No. 3 (25); No. 2 (11); No. 5 (0).

The second inter-section Cross-Country run of the winter season was held on the 17th over a course of 5½ miles. Of the 100 starters, 89 finished, the first home being Cpl. Clarke (No. 3 Section), with Boys Louther and Moule, both of No. 2 Section, 2nd and 3rd. No. 2 Section were the winners with a total of 82 pts. followed by No. 4 with 97, No. 3 with 140 and No. 5 with 190.

The replay of the Cup-tie between No. 4 Section, Halton and R.A.F. Records in the Third Round of the R.A.F. Cup took place at Halton on the 31st Jan. After a very clean and exciting game the Home Team managed to score two goals in the last ten minutes of the game, both goals being scored by AC. Wardle.

(Unofficial Report.)

Iraq Polo.

The following are extracts from the *Baghdad Times* of Jan. 11th and 16th, 1923:—

"The semi-finals of the Polo Tournament for the Bonham Carter Cup took place yesterday afternoon, when Air Vice-Marshal Sir John Salmond and Officers of the R.A.F. gave an 'at home' on the polo ground. There was a large attendance, most of the prominent military, civil and commercial residents of Baghdad being present. Both semi-finals were very closely contested, each being won by the odd goal in five, which gives an indication of the keenness which prevailed throughout.

"The first game was between the R.A.F. 'B' team and the Royal Artillery. The sides were as follows:—R.A.F. 'B': S/Ldr. Bowman, F/Lt. Massay, S/Ldr. Williams and F/O. Carter. R.A.: Lt. Orde, Lt. Stansfield, Capt. McNally and Col. Vincent. After four hard chukkers the Royal Artillery, although they were handicapped 2 goals, won by 3 goals to 2.

"The second semi-final, which proved the better game of the two, was between the R.A.F. 'A' team and the Mosul team. R.A.F. 'A': Wing/Cmdr. Bradley, Group/Capt. Boyle, the Air Vice-Marshal and Wing/Cmdr. de Dombasle. Mosul: Capt. Gahan, F/Lt. Cunningham, Capt. Gowan and S/Ldr. Hazell.

"This match resulted in the same score as the previous one, the Air Force winning after four very strenuous chukkers by 3—2. It was generally considered that the Mosul team were unfortunate in losing as they put up a splendid fight. Wing/Cmdr. Bradley for the Air Force and F/Lt. Cunningham for Mosul were the outstanding players.

"After the games tea and refreshments were provided for the guests, for whom most hospitable arrangements were made. The band of the 2nd West Yorkshire played an excellent selection of music during the afternoon.

"The final of the Bonham Carter Cup was played on Monday afternoon (Jan. 15th) under ideal weather conditions. The R.A.F. 'A' started one goal up on the handicap, but halfway through the first chukker the R.A. drew level with a goal by Mr. Orde. Almost immediately afterwards Group/Capt. Boyle scored for the R.A.F., and a fast and exciting period ended with Mr. Stanfield equalising for the R.A.

"The next three chukkers were hotly contested and full of incident, but they produced no score, though each side in turn had its share of the attack.

"Extra time was played with widened goals, and for a few minutes the R.A.F. goal was in danger, but Wing/Cmdr. Bradley made a brilliant run nearly the length of the ground, and after a scrimmage in front of goal the R.A.F. scored.

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"Wing/Cmdr. Bradley played a great game, and was the outstanding man of the two teams, but all the players produced their best form for the occasion, and the match was a fitting conclusion to a most enjoyable tournament, which should give polo in Baghdad most decided encouragement.

"Col. Hadow and the officers of the Norfolk Regiment were at home to a large number of spectators, among whom were H.E. Sir Percy Cox and Lady Cox. The latter presented the cup to Sir John Salmond, the captain of the winning team. The players were :—R.A.F. : 1 Wing/Cmdr. Bradley, 2 Air Vice-Marshal Sir John Salmond, 3 Group/Capt. the Hon. J. D. Boyle, Back Wing/Cmdr. de Dombasle. R.A. : 1 Mr. Orde, 2 Mr. Stanfield, 3 Capt. McNally, Back Col. Commandant Vincent."

An R.A.F. Ball.

On Friday January 26th the Officer Commanding and Officers of the Royal Air Force, Milton, held their first Annual Ball in the Guildhall, Abingdon. About 130 guests were present.

A very excellent programme of music was rendered by the orchestra (under the able leadership of Sergeant Preston).

All present enjoyed a very successful evening and many are already looking forward to the next.

55 Squadron Dinner.

55 Squadron Association will hold its 5th Annual Dinner at the Imperial Restaurant, better known at Oddenino's, 70-2, Regent Street, on Saturday February 24th, at 7.45 pm. Will all past and present officers of the Squadron intending to be present notify Wing/Cmdr. S. E. A. Baldwin, D.S.O., Staff College, Andover?

NEW COMPANIES.

AIRCRAFT OPERATING CO., LTD.—(187,441). Private Company. Registered January 30th. Capital £6,000 in £1 shares. To secure and carry out contracts in any part of the world for aerial surveys, for the management, operation or agency works of air lines and for the carrying of passengers, freight, specie and mails, for the equipping of aircraft expeditions for Governments and others, to carry on the business as aerial and general photographers, etc. The first directors are :—

A. S. Butler, 40, Park Lane, W., permanent governing director and chairman (director of De Havilland Aircraft Co., Ltd.)

H. Hemming, R.A.F. Club, 128, Piccadilly, W., aviator (managing director).

T. P. Mills, "Eamont," Hook Heath, Woking, solicitor.

A. S. Butler may appoint one director. Qualification of managing director 100 shares. Registered office :—11, New Court, Carey Street, W.C.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Feb. 4th :—

LONDON—PARIS :

Handley Page Transport, Ltd., machines 4*, passengers 14. Air Union, machines 8†, passengers 9. Total machines 12, passengers 22.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 2*, passengers 8.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 11, passengers, Manchester-London, 8, London-Amsterdam, 12.

LONDON—ROTTERDAM :

K.L.M., machines 3, passengers 1.

SPECIAL MACHINES :

London-Madrid (Bristol Aeroplane Co.), machine 1*, passengers 0.

Total number of trips by British machines : 18, carrying 42 pas.

Total number of trips by foreign machines : 4, carrying 10 pas.

Trips per day.—Monday, 9; Tuesday, 4; Wednesday, 5; Thursday, 2; Friday, 3; Saturday, 0; Sunday, 6.

STATISTICS.

Machines, 29; Passengers, 52; Crews, 61; Total Personnel, 113.

Corresponding week last year :—

Machines, 22; Passengers, 42; Crews, 33; Total Personnel, 75

Corresponding week, 1921 :—

Machines, 13; Passengers, 8; Crews, 14; Total Personnel, 22

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

THE A.D.C.

The Aircraft Disposal Company have some very interesting machines in various stages. An F.4 "Tinsyde" has been fitted with a streamline nose and two Lamblin radiators for demonstration work. Mr. Perry has been testing another F.4 with a "boosted" Hispano engine. This machine does 139 m.p.h. at 10,000 ft. On Wednesday Capt. Stocken took an Avro to Bristol where it is to be fitted with a 100 h.p. Bristol "Lucifer" engine. This machine is to be kept at Croydon for demonstrations.

A highly revolutionary type of monoplane is being erected by the A.D.C. for a foreign client. No details are yet available but the machine promises to be very interesting indeed.

OTHER FLYING.

The Air Lines have had a poor week of it owing to gales and bad weather generally. Thursday was a blank day so far as the cross-Channel services were concerned and on Friday the only machine to cross was a Daimler D.H.34 piloted by Mr. Hinchliffe.

On Friday the Daimler Airway had their first forced landing caused by anything other than weather conditions. The new 34, G-EBCX was forced to land near Northampton with minor engine trouble. It seems impossible to connect a Napier "Lion" with engine trouble especially under the Daimler system of inspection and maintenance, but anyhow they will not go far wrong if they only have one such trouble for every 300,000 miles covered.

The respective General Managers of the H.P. Transport Ltd. and the Daimler Airway have returned from Warsaw and Wiesbaden respectively.—G. D.

Stag Lane Aerodrome.

During the month of January the De Havilland Aircraft Co. Ltd. did a total of 28 hours 5 mins. flying of which 12 hours 40 mins. was general flying. The following places were visited—Borden Camp, Paris, Manchester and Coventry.

Four pupils are receiving instruction, including Mr. Oscar Gnosspelius, who was in fact the first man to fly off water in Great Britain, since when he has used no other.

From now onwards with the lengthening of the amount of daylight and the probable improvement in the weather, the De Havilland Hire Service should begin to show their old form. Additional pupils are expected to join the flying school in the course of the next few weeks.

The De Havilland Aircraft Co. have decided since the New Year, to acquire fresh glory. An Association football team has been raised and on January 6th they played a match with Handley Page Ltd. on the Stag Lane aerodrome, which resulted in a draw. On Saturday, January 27th, they played a return match on Cricklewood aerodrome and were beaten.

This result, far from damping their ardour has merely infused in them a spirit of conquest with the result that they are anxiously seeking matches with any aircraft firm in the London district.

They desire it to be made known that their team consists entirely of office staff and pilots and that all teams desiring to oppose them shall be of the same type and specification. Any aircraft firm willing to challenge the D.H.XI (not powered with two Dragonflys) should communicate with Mr. F. St. Barbe, De Havilland Aircraft Co. Ltd., Stag Lane Aerodrome, Edgware. Any difficulties as to ground will always be met by the De Havilland Co., who possess an excellent ground on the Stag Lane aerodrome.

The England to India by Air Film.

Mr. Geoffrey Malins recently gave a private show of the film which he took when he flew from Croydon to India mostly with Mr. Norman MacMillan in a D.H.9. It is certainly one of the most interesting pictures one has seen of its kind.

Mr. MacMillan's start from the premises of the Aircraft Disposal Company at Croydon is shown and the various stages of the flight to India are seen of which one of the most interesting is undoubtedly the trip across the desert to Baghdad.

Another very interesting bit is that showing the Taj Mahal at Agra.

Among those present at the showing was General Brancker who judging by his remarks knew the whole route inside out.

—G. D.

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FEB. 14. 1923.

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ON THE ROYAL AIR FORCE RESERVE.

On February 9th the Air Ministry issued the long-expected announcement concerning the Reserve of Air Force Officers. This reads as follows :—

A.M. No. 828.

The recent decision to proceed with the expansion of the R.A.F. by the formation of a force for Home defence entails an increase in the size of the Reserve.

The formation of a Reserve of Officers was provided for by the Short Service Commission scheme announced in 1919 which is now beginning to supply an automatic flow of officers to the Reserve after a period on the active list.

In addition provision has now been made for the expansion of the Reserve by the entry as officers of a number of ex-officers of the Flying Services and others with special qualifications for flying and technical duties.

Provisional regulations for the Reserve of Air Force Officers are in course of preparation and will shortly be available for issue.

Meanwhile, the Air Ministry is prepared to receive and consider applications for enrolment in the Reserve from the following classes :

(a) Officers who served as pilots in the R.F.C. or R.N.A.S. and who were demobilised before they had completed their Reserve Service.
(b) Other officers who served as pilots in the R.F.C., R.N.A.S. and/or the R.A.F. during the Great War.
(c) Gentlemen qualified as civilian pilots who have not previously held any commission in the R.F.C., R.N.A.S. or R.A.F.
(d) Officers who served in a technical branch of the R.R.C., R.N.A.S., and/or the R.A.F. during the Great War.
(e) Gentlemen who possess the necessary technical qualifications in connection with aircraft in the following branches :—
  (i) Engines and rigging.
  (ii) Wireless telegraphy and signals.
  (iii) Photography.
  (iv) Armament.
  (v) Airships and Balloons.
  (vi) Stores.

Full details and forms of application may be obtained by writing to the Secretary, Air Ministry, Kingsway, W.C.2. Personal applications should not be made.

That is the plain official statement as it stands. It has been possible thanks to the courtesy of the Air Ministry to obtain certain other information which has not as yet been issued officially.

In the first place the Ministry is for the time being dealing with officers only. The other ranks of the R.A.F. Reserve are being filled by the natural outflow of time-expired men from the R.A.F. itself. It is possible that at a later date men may be enlisted for the Reserve, but it seems unlikely.

Incidentally one regrets to see the Air Ministry using in an official document that objectionable journalistic phrase "The Great War" when the R.A.F. Staff College has set it the example of using the simple and correct phrase "The War 1914-18." It is to be hoped that this error in taste will not occur again.

The Categories.

One learns that the officers of the Reserve are to be divided into six categories :

(A) Flying Officers who have served in the Flying Services. These themselves fall more or less automatically into categories.

(1) Retired or resigned Permanent Commission officers.

(2) Retired Short Service Officers, who automatically come into the Reserve.

(3) Former officers of the R.N.A.S. or R.F.C. who went into civil life during the War 1914-18 and who still have a period of Reserve service unexpired.—It seems unlikely that there will be any considerable number of these.

(4) Officers demobilised from the R.N.A.S., R.F.C., or R.A.F. during and after the War and now in civil employ. —This group is likely to provide the bulk of the number now required.

(AA) Gentlemen qualified as civilian pilots who have not previously held commissions in the Flying Services. The Air Ministry does not state what qualifications are necessary for a candidate to be considered a gentleman. But in any case the number coming into this category must be extremely small. There are very few pilots who during the war did not serve in the Flying Services and there are very few who have learned to fly since the War and are likely to want to join the Reserve.

(B) Former technical officers of the Flying Services who are specialists in (a) Engines and riggings, (b) Wireless and Signals, (c) Photography, (d) Armament, (e) Airships and Balloons, (f) Stores, (g) Miscellaneous.

(BB) Gentlemen with similar technical knowledge who have not held commissions in the Flying Services.

There are also class (C) for Accountants and others not in class B, and class (D) for Medical Officers, but no officers are being taken on in these two classes for the present.

Terms of Service.

All Reserve Officers are liable to be called up for service anywhere in any part of the World at any time of national emergency.

No officer will be entered in class (A) above the rank of Flying Officer, but promotion will follow in due course.

Officers will be entered in class (AA) as Pilot Officers on probation and will be confirmed in their rank after six months' satisfactory service in the Reserve. They will be eligible for promotion to Flying Officer after 18 months.

Classes (A) and (AA) will be enrolled for a minimum of 3 and a maximum of 5 years. Class (B) for 4 years and class (BB) for a minimum of 3 and a maximum of 5 years.

Candidates for classes (A) and (AA) must be under 31 years of age but special cases will be specially considered.

Retiring ages will be 40 years in Classes (A) and (AA) and 45 for Classes (B) and (BB) for Pilots and Flying Officers, 45 for Squadron Leaders and 48 for Wing Commanders in all four classes.

Pay when on duty will be at current R.A.F. rates.

Training.

Officers of Classes (A) and (AA) will have to do not less than 12 hours' flying per annum on up-to-date war machines. This will be done in quarterly instalments of not less than 2 days' service per quarter.

In special cases an officer may do all his training in one course.

The maximum period for training will be 24 days per annum.

Officers of Classes (B) and (BB) will be liable—if called upon—to do a technical course of 14 days each year. If this has to be done in the form of a clear fortnight on end it may be difficult for some people to get away from business for so long.

Training may be done at R.A.F. stations but, as was indicated in THE AEROPLANE many months ago, arrangements are being made with civilian firms to provide aerodromes and training facilities. At present, one gathers, negotiations are in progress for such arrangements with the De Havilland Co. for the London Area, with the Armstrong-Whitworth Aircraft Co. for the Midlands, with the Bristol Co. for the West Country and with Beardmores for Scotland.

It seems probable that when the scheme is in operation further arrangements may be made with the seaplane firms in the Southampton area for seaplane training, but for the present the Air Ministry seems to be wisely waiting and

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seeing how many people join the Reserve before it commits itself further.

An Immediate Opportunity.

Altogether the scheme seems very sound so far as it goes, and it offers an immediate opportunity to those ex-officers who are still keen on flying, as so many of one's friends are. One gathers that the strength of the Reserve in the next year or two is to be 700 officers and 12,000 men, so there is room for several hundreds immediately. It is said that a sum of about £250,000 per annum is to be spent on this scheme. It is as inadequate as is all expenditure on the Air Force, but it may serve for the time being until either the Nation wakes to the importance of Air Power or until the outbreak of the Slav War forces the Nation to wake. In any case it is something to have a Reserve scheme in being and on that step forward the Air Council deserves congratulations.—C. G. G.

TERRITORIAL AIR DEFENCE.

According to the *Morning Post* the Territorial Army is to provide two Air Defence Brigades primarily for the defence of London, at a total annual cost for the two Brigades—exclusive of the R.A.F. Squadron (or squadrons) co-operating with the ground troops—of £110,000.

There is at present one Air Defence Brigade in the Regular Army. This Brigade is stationed at Blackdown, in the Aldershot Command, one believes under Colonel-Commandant Ashmore.

The two Territorial Brigades are known as the 2nd and 3rd Air Defence Brigades. Col. D. H. Gill is in command of the 2nd Brigade, and Lieut.-Col. T. C. Sinclair is his Brigade Major. The Brigade Commander of the 3rd Brigade is Col. H. S. de Brett, and Captain P. F. M. Micheli is the Brigade Major. Each Brigade is composed of two Brigades Royal Garrison Artillery, with a special establishment of three 8-gun batteries to each Brigade, a battalion of sappers, and a Signal Company, and all come under the heading of the Army Troops.

It is stated that the anti-aircraft guns will be carried on travelling carriages and that in all probability they will be mounted on petrol-electric lorries. The searchlights, too, will be fixed to some kind of motor vehicle. Thus in due course we shall probably hear all over again the yarns published during the war of Archie guns firing as they run.

It is further stated that the first annual practice camp will be in August or September at a convenient place on the coast—probably the Wash—where squadrons of the Air Force will co-operate and that the training will include actual firing at aeroplanes during flight, the bursts being timed to take place at half the range. The "expert" who writes on the subject says:—"A little intelligent observation and easy calculation will enable the instructors to say whether the fire would be effective."

One imagines that the R.A.F. would prefer live shell under normal war conditions for then there would be little likelihood of anybody being hit, whereas if deliberate attempts be made to avoid hitting anybody it is probable that something will go wrong and somebody will be brought down in flames.

THE NEXT BRITISH AERO SHOW.

It is understood that many people in the Aircraft Industry view with favour the proposal that the next British Aero Show should be held at the Crystal Palace in preference to Olympia or the forthcoming British Empire Exhibition at Wembley.

If we are ever to make the Aero Show an artistic success as are the shows at the Grand Palais then the Crystal Palace (the French must distinguish between it and the edifice of the same name in Paris) is the only possible place where such success could be attained.

The train service from the West End and the City to the Palace is the best in South London and it is well fed by 'bus and tram (and Joseph Lyons and Co. Ltd.).

It is but 15 minutes in a car and but a little more by train or tram from Croydon Aerodrome so that visitors to the Show could go on there and see the machines in actual flight.

The management of the Palace view the project with favour and there are many other reasons which make it the ideal place for the next Aero Show.—G. D.

NORTHERN AERO CLUBS.

Everyone will learn with interest that "The North-East Coast Aero Club" has been formed recently. The Secretary is Mr. Andrew Rutherford, jun., and the address of the Club is the Crown Hotel, Newcastle-upon-Tyne.

The object of the Club is to bring together enthusiasts in the North of England and thereby further the interests and study of Aeronautics.

A syllabus of lectures and papers has been arranged and model work has already been started.

It appears that there is considerable enthusiasm in aviation in the North as one is told that an Aero Club is also in process of formation in Manchester to replace that which died some time before the War when aviation ceased for a time to produce limelight effects. One wishes both concerns the best of luck in the work which they have set out to do.

THE BISKRA GLIDING MEETING.

After a considerable period of indecision the Biskra meeting opened on January 26th. One does not profess to know the regulations that govern this meeting, but it would appear to the uninitiated that the principal object of the affair is to guarantee a small and select gathering of French pilots whose sole aim is to stay in the air as long as possible.

The meeting began with a period of dead calm and it was not until January 30th that the wind got up. At 10.50 hours on that day Lieut. Thoret on a flexible-winged Dewoitine monoplane glider took off. At 13.12 o'clock Adjt. Descamps took off on a similar machine.

At 14.44 Lieut. Thoret landed after a *vol plané* from 100 metres within 5 kilometres of his point of departure after a flight of 3 hrs. 55 mins. Adjt. Descamps landed at 16.50 hours owing to the approach of night after having remained in the air for 3 hours 47 mins.

On January 31st M. Georges Barbot, also on a Dewoitine flexible-wing monoplane, got away at 08.23 hrs. and rose to a height of 200 metres. At 08.29 o'clock, Adjt. Descamps started on a Dewoitine rigid thick-winged monoplane. At 09.00 Lieut. Thoret on a Dewoitine flexible-wing monoplane endeavoured to get off but a gust of wind took him under the left wing and blew him onto some rocks. Thoret was uninjured and he immediately got into a Hanriot H.O.14 training biplane, with a passenger, and did 15 mins. with his airscrew stationary.

At 12.41 o'clock Adjt. Descamps, feeling indisposed, landed after a flight of 4 hours 11 mins. At 16.59 o'clock Barbot landed after remaining in the air for 8 hours 36 mins. He was carried away in triumph.

This flight which beats that made by M. Maneyrol on the Peyret monoplane at Cherbourg on January 29th, was made in a wind of a velocity of 12-15 metres per second on one of the Dewoitine monoplanes used at the Combegrasse meeting last summer and is exactly similar to that machine on which M. Barbot experienced misfortune at the Itford meeting.

Thereafter light winds prevented further flights until February 5th when Adjt. Descamps made a flight of 2 hours 46 mins. and Lieut. Thoret did 1 hour 58 mins.

AERONAUTICAL INDIGESTION.

According to an American publication that calls itself the "Aeronautical Digest" and is edited by a Mr. Chas. J. Glidden whose name was much advertised some years ago in connection with a motor tour on a Napier car, "Writing in the sky was put on a commercial basis in Paris with the beginning of air advertising by an American firm whose airplanes equipped with smoke-ejecting attachments wrote advertisements for staring Parisians."

Even if Parisians do stare it is decidedly unkind of an American firm to filch the patents of Major J. Savage in order to advertise the fact. Incidentally Mr. Tait-Cox has been in Paris for some weeks instructing French pilots in the art of sky-writing on an S.E.5a, and M. Flachaire, a well-known French "ace" and the first of Mr. Tait-Cox's pupils in France was the first Frenchman to do "sky-writing" over Paris. Mr. Cyril Turner, of Major Savage's firm, was the first pilot to do sky-writing in America.

So far as one knows Americans have nothing to do with sky-writing in France, their only concern being possibly that they were not quite 'cute enough to think of it first. Meantime the "Aeronautical Digest" seems to have suffered rather badly from indigestion of its facts.—L. B.

THE GOTHENBURG AERO EXHIBITION

The following French firms have definitely booked space at the Gothenburg Aero Show: Henry Potez, Caudron, Société Nieuport-Astra, Hanriot, Lioré et Olivier, Radio-Electrique, Société des Etablissements Aera and Précision Moderne, Louis Bréguêt, Hispano-Suiza, Pierre Levasseur and P. Ratier. Fokker has also taken space, and Czecho-slovakia and the U.S.A. will be represented. Nothing further is known of British activities.

THE INSTITUTION OF AERONAUTICAL ENGINEERS.

Owing to unforeseen circumstances it becomes necessary to cancel the meeting advertised for Friday February 23rd. The remainder of the Fixture List stands as arranged.

The attention of Members is drawn to the near approach of the General Meeting on March 9th, when a considerable amount of important business will be under discussion.—(Signed) L. Howard-Flanders., Hon. Sec.

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THE AIR CONFERENCE.—II.

Owing to the fact that the Air Conference opened on Feb. 6th while last week's issue of THE AEROPLANE was going to press it was only possible to publish in abbreviated form the two papers of the Conference which were read by Air Ministry officials, namely those of Air Vice-Marshal Sir Geoffrey Salmond and of Major-General Sir Sefton Brancker.

The Chairman at the first session was Sir Samuel Hoare, the new Secretary of State for Air, who in his opening address admitted frankly that the two chief obstacles to the rapid extension of flying were the general shortage of money and the post-war confusion of the world. He said that at the present moment our air defences were very low as compared with those of other great Powers and there did not seem to be at the moment any possibility of any reduction. Under those circumstances it was inevitable that the great part of the national expenditure on air must for the present be spent upon the militant side of aviation. We could not afford to let our air defences fall below the Empire's needs.

A HUMBLE SUBMISSION.

One submits with all respect that this was an unfortunate tone for the Air Minister to have adopted in opening a Conference of this nature. His attitude undoubtedly should have been rather that adopted by his predecessor Capt. Guest in the House of Commons when instead of lamenting that it was impossible to cut down the Air Force any further he boldly informed the House that they must be prepared for great expansions in the Air Force and a corresponding increase in the Air Force Vote in the future.

The action of the Government in such a matter must depend very largely on the tone adopted by the Air Ministry in introducing the subject to the Cabinet and after all the Cabinet is only composed of men and is as much amenable to the laws of mob psychology as any other agglomeration of human beings. If Sir Samuel Hoare's attitude to the Cabinet is that he is sorry he cannot reduce the Air Ministry Vote the probability is that some eminent "Diehard" in the Cabinet will insist on reducing it by 10 per cent. or the like. If on the other hand he approached the Cabinet with the suggestion that the Air Force ought to be doubled he would certainly excite criticism but he might get an increase of anything between 10 and 25 per cent.

If this precious Conference at the Guildhall had really included the people who matter his opening remarks might have had on the free and independent voter an effect very similar to that which one may expect his attitude to have on the Cabinet. Fortunately his audience at the Guildhall consisted, as one of the pioneers of aviation put it, of "the sort of attendance one gets at a Royal Aeronautical Society lecture" plus a fair number of those people who turn up once or twice a year at aeronautical functions so that they may pose as being authorities on aviation or patrons of the art and science.

It is improbable also that very many people have taken the trouble to read the voluminous and extraordinarily dull reports of the Conference which have appeared in our leading news-sheets and consequently the probability is that comparatively little harm has been done. One has devoted so much space to this comparatively small point because Sir Samuel Hoare is at present an unknown quantity so far as aviation is concerned and everybody concerned with aviation is at present in a mental state of benevolent neutrality so far as he is concerned. It remains to be seen whether in future he develops as an Air Minister along constructive lines and so wins the wholehearted support of everybody concerned with aviation or whether he proves to be conservatively apologetic for the existence of such a radical innovation as the Air Ministry.

AN APPRECIATION OF THE POSITION.

In favour of the former alternative it is to be recorded that Sir Samuel Hoare said definitely in his opening speech that his first act as Secretary of State for Air was to obtain the permission of the Government to go on with the Home Defence development scheme and that he hoped that this explanation would not only strengthen our air defence but would also give a stimulus to the Aircraft Industry. That at any rate shows a proper appreciation of the position.

Thereafter he said that within the limitations imposed upon him he was determined to try to develop a consistent Civil Aviation policy. This would be based on two ideas: (1) That the contract for the operating companies should be sufficiently long to justify them in sinking capital and developing their routes and (2) the Government should interfere as little as possible under a subsidy scheme. He wanted to see the operators working out their own salvation. Subsidies could only be justified if after a limited time they enabled the industry to support itself. They were unjustifiable as a form of outdoor relief. Moreover no subsidy system should be so arranged as to hinder the useful work now being done by air-taxi firms and small unaided enterprises.

Furthermore he was anxious to see a beginning made with an Imperial air route whether by aeroplane or airship. He did not want to see air questions discussed in an atmosphere of stunts. They must come down from head lines to an atmosphere of quiet development and discussion. What was chiefly wanted with air questions at the present time was an instructed public opinion.

These sentiments are of course absolutely unimpeachable and show that apart from what looks like a slight error in psychology Sir Samuel Hoare has undoubtedly perfectly correct views on the development of aviation.

THE REMAINING PAPERS.

As already mentioned the papers read by Air Vice-Marshal Sir Geoffrey Salmond and General Brancker were published last week. Hereafter follow the other papers which were read by Mr. C. R. Fairey, the Chairman of the Society of British Aircraft Constructors, on Seaplanes, and Col. Alec Ogilvie, the well-known aeronautical consulting engineer, on gliders. Commander Burney's paper on Airship Services will be reported separately.

Mr. Fairey's paper has been characterised by one of considerable technical knowledge as the most valuable contribution to the development of sea-going aircraft which has yet been published. Mr. Fairey has not laid down any laws nor has he announced any startling discovery, but he has put forward for consideration the general problems of the design of sea-going aircraft in such a way that they would provide food for thought to every aircraft designer concerned with this type of machine and so will conduce to a general all-round improvement in design.

Mr. Fairey's paper has been very carefully abbreviated by Capt. Sayers, the Technical Editor of THE AEROPLANE, whose own knowledge of seaplanes and especially of float design is recognised by our leading aircraft scientists.

Sir Henry Maybury, President of the Institute of Transport, presided at the afternoon session of the first day.

SEAPLANES.

By Mr. C. R. FAIREY, M.B.E., F.R.Ae.S

INTRODUCTORY.

It is a remarkable fact that although at quite an early stage the design of aeroplanes settled down into practically one universal type—the tractor—the seaplane is still in an unsettled state even as regards an accepted general arrangement, and there are quite sharply divided opinions as to the relative merits of different types partly because proper comparative tests have never been made. Much that is matter of opinion to-day could, by proper full-scale experiment, be established as a matter of fact.

Therefore, the design of seaplanes is a subject on which it is as difficult to dogmatise as it is easy to start a discussion, and it is possible here only to indicate some of the problems that most affect design and operation rather than to state with any confidence what are their best solutions.

The various controversies that have taken place on the subject have ranged from details of construction to discussions as to whether the type itself has any proper function. The author has heard it argued that since mankind does not live on the sea the sea should be flown over and not landed on, the purpose of the flying machine being to communicate from one piece of land to another, or alternatively to a ship where it can be landed on or launched from the deck.

Of the many fallacies in this argument the principal one lies in the fact that whatever stage of perfection aircraft engines may reach, the propelling power can never be of such an order of reliability as to render the machine absolutely immune from forced landings. A paragraph in the Press not long ago showed that no less than 20 ships were adrift on the oceans of the world with broken-down engines within 24 hours and since the breakdown of the power unit of a flying machine must result in a forced landing within the space of a few minutes it is obvious that the proper type of machine for flying over seas must definitely be capable of alighting on and rising from the surface.

Apart from that important fact an equally great advantage of the seaplane is that coastal harbours, big rivers and inland lakes provide natural "aerodromes" from which it can be operated, and in certain districts they can be used over country over which aeroplanes could positively not fly in safety. Practically from one end of Canada to another the countryside offers infinitely more safe alighting places for seaplanes than for land machines. The great rivers of the world provide ready-made routes for seaplane services

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from which the danger of forced landings are nearly eliminated. Their equivalent for aeroplanes would be a continuous chain of aerodromes of quite prohibitive cost. The great archipelagoes of the Far East and African swamps are examples of country where the seaplane is the only practical means of flying.

From the naval point of view whatever may be done with specialised aeroplanes operating from carrier-ships it is obvious that conditions will set a strict limit of size to such machines and for big-range reconnaissance at sea and for carrying big loads for offensive operations the development of the seaplane is the all-important factor that should not be neglected.

Modern Types.

Though there is as yet no settled type with seaplanes they may be classified into two main types—the flying-boat and the float-seaplane. Each class can be sub-divided into further types, and each type has its particular advantages and its particular difficulties in design and operation. Apart from certain controversial features, preference for one type or another is mostly dictated by local requirements. With development in size certain characteristics will become predominant and greater settlement of type may be expected.

The Flying-Boat.

With flying-boats the principal division of type, apart from the constructional methods in building the hulls, comes with the arrangement of the step and shape of the hull beneath the water-line. Although there are very few examples of what might be called the single-step hull, the second step in most hulls is atrophied to represent little more than a skin wave-breaker to keep the tail clean. In operation the difference lies in the fact that the single-step type at or over hydroplaning speed exerts only small trimming moments due to water pressure, and the fore and aft attitude of the machine when taking off and landing is under the control of the pilot. It has the advantage that a large angular range of movement is available to assist the machine in riding over rough water head-on to sea and prevent any tendency to burrow in a head-sea but it is very subject to "porpoising" if not skilfully controlled.

With the two-step type in which the second step is highly developed the intention is that the hull shall be stable from zero to taking-off speed and shall itself take up the best attitude when running on the water. It needs less skill in piloting but has not the advantage of the single-step in the rough sea. Most modern machines have adopted a compromise between these two conditions in which the second step is very small and the best features of both types are obtained.

Under the water-line both types of hull vary in design from the flat bottom of the Savoia type to the sharp V of the Linton Hope hulls. The flat type by its greater hydroplaning efficiency is easier to take off smooth water but meets with correspondingly greater impact on landing. The V-type makes much easier landings but its hump-speed is higher and not so sharply defined.

The Float Type.

The float-type of seaplane is in appearance a normal aeroplane in which the floats or pontoons take the place of the usual landing chassis. Actually owing to the different distribution of masses and head resistance it is very different structurally and presents a different problem in stability and control.

There are many more variations of float-shape for this type than for the boats. The principal division is the twin-float and the single-float. Both single- and twin-float types can be further divided into the single-step and two-step classes as are the boats, with an additional intermediate type with a single step but with a buoyancy chamber or extended stern of the float aft of the step which provides complete or partial fore and aft stability on the water but exerts little or no hydroplaning effect. This pattern is intended to combine the advantages of the single-step as to control of the attitude on the water and of the two-step for stability when adrift. An interesting example of this type is the Brandenburg float much favoured by the German designers during the war in which the stern of the float is extended aft and terminates in a vertical stern-post as distinct from the flat or V-shape.

Twin-float types have not been built or used so much in the large sizes as the boat-type but owing to certain particular advantages are popular up to about 6,000-lbs. gross weight. It is interesting to note that the twin-float type was favoured in Germany during the war to the almost entire exclusion of every other class. In England it was much used for special purposes but in France and Italy the boat-type has been shown preference. In America preference seems to be equally divided but large twin-floats have not as yet been developed and so no comparison can be made with contemporary large boats.

The only modern representative of the single-float type in this country is the Parnall "Puffin" amphibian which is a special-purpose machine, but in America a considerable variety of single-float machines are built. Although this type has a small advantage over the twin-float in structure weight it has the serious disadvantage of lateral instability on the water which necessitates the use of large wing-tip floats.

An attempt will be made later on to show that the general average of advantage and disadvantage between the boat- and the twin-float type really sorts itself out in terms of dimensions and local requirements but broadly speaking they may be classified as follows:—

Boat.

Advantages.	*Disadvantages.*
Light structure weight.	Eccentricity of centres of thrust, gravity and head resistance coupled with necessity of carrying down load on the tail.
Large reserve buoyancy of the hull.	Difficulty of beaching.
Ample stowage room and accommodation for crew and equipment.	Risk of total loss through damage to hull.
Ease of mooring and handling by crew on water.	Dependence on wing-tip floats for lateral stability in side winds.
Good view of the pilot.	

Twin-Float.

Advantages.	*Disadvantages.*
Lateral stability on the water.	High structure-weight percentage.
Concentricity of forces with improved performance and ease of control.	Large fuselage stresses set up by floats and tail float.
Ease of handling and repair.	Difficulty in mooring and handling by crew on water.
Compartmented floats with less risk of loss.	

This statement applies chiefly to single-engine machines and the basis of comparison alters when applied to larger or multiple-engined types, increase in size having the most marked effect.

Comparing flying-boats and seaplanes on the basis of structure-weight percentage of total weight it would appear that the average advantage lies with the float seaplane for small sizes and the boat-type for large sizes—but this may be modified if any one special feature is necessary. Also choice on the structure-weight basis has one serious drawback, as both the single-engined float and the multiple-engined boat-types have unprotected propellers, a feature which is the principal objection to both types.

Practical Problems.

Seaworthiness.

In dealing with almost every practical problem in design and handling of seaplanes one is obliged to refer to the same problem twice over in relation to the two types. The advantage goes to one type or the other in varying cases and the best type for any given purpose is only dictated by the requirements.

The question round which the greatest controversy has raged is that of seaworthiness and this term is not usually properly defined. The conditions of seaworthiness must first be studied. They are usually totally different according to whether the machine is under power or adrift. The very qualities which make for improvement in the one case are frequently a disadvantage in the other.

If we first consider the case of taking off we find it brings out a marked divergence as between the single-step and the two-step types. The two-step endeavours to adhere rigidly to a certain angle of attack on the water and even at speed there is not sufficient air control to regulate this angle through a very large range. With the single-step the machine is not stable on the water fore and aft when hydroplaning and all the control must come from the air surfaces, but a very large range of control is available and can be used to ride over a rough sea into which the two-step type, either boat or float, tends to plunge.

Take the case of the single-step type with no buoyancy aft of the step, the pilot when hydroplaning has the maximum control of the angle of the machine. Obviously this type of machine is easy to manipulate over a swell by use of the air controls.

With long floats, the machine will endeavour to maintain its own angle and there is a strong tendency to plunge into an advancing sea. The advantage is obviously with the single-step type.

But when the engine has stopped and the machine is adrift with the sea anchor out head-on to the sea and drifting astern, the loads on the tail-float apply serious stresses to the fuselage at about the region of the pilot's seat with consequent risk of break-up and loss of the machine. These loads are accentuated by the wind-load on the wings which are at a considerable angle of attack. In the case of

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the long float, the machine rides on the water without any stress on the fuselage and the wings are presented to the wind at a lower angle of attack. We have here two opposite cases of seaworthiness in which one type or the other gets the advantage according to the conditions.

When alighting the conditions again favour the single-step type as the angular range available can be used by the pilot to make a "landing" in the best attitude possible and there is no risk of a sea striking the stern of the float so far aft as to throw the machine over forwards. The same comparison could be made between boats of the single- and two-step types but the difference here is not so marked.

Another important condition for seaworthiness is that of turning across wind. Under these conditions a large upsetting-couple is applied to the wings tending to tilt the machine over sideways. This necessitates in boat- or single-float types the use of very large wing-tip floats and gives the twin-float a considerable advantage.

Other seaworthiness conditions are largely structural. Large reserve buoyancy in hull and wing-tip floats will give greater safety at the price of increased weight and head resistance, and naturally the stronger a float is built and the more bulkheads are included the heavier it must be.

Light fabric-covered wings cannot possibly withstand the force of the water when seas break over them and it is difficult in the boat-type to give the lower wing clearance in this respect. The metal cantilever wing is here at a great advantage. The ideal wing would be planked all over and strong enough for a man to walk over. Here there are great possibilities in the cantilever form of wing construction wherein the skin is stressed as part of the structure.

Seaworthiness is largely a matter of size in seaplanes as in ships, and seaplanes cannot reasonably be expected to be any better than their equivalent size in boats and yet flying-boats have been successfully handled in a sea which motor-boats of equal displacement could not negotiate. In large sizes the improved structure-weight of seaplanes will give an available margin of weight to be used for their improvement in seaworthiness and local strength.

The conditions of taxying or handling at slow speed in relatively smooth water present very little difficulty by the use of suitable water rudder inter-geared with the air rudder. In coming up to an anchorage and for ease in picking up a mooring the advantage is greatly with the boat-type. With the twin-float special mooring gear has to be arranged whereby the machine can overrun the mooring which has to be picked up from the rear cockpits but in bringing up a slipway the twin-float is superior as it can be driven direct onto the slipway under its own power, the flat bottoms of the floats and absence of the keel enabling this to be done without risk of damage.

When used from rivers or lakes of small size many of these seaworthiness conditions do not have to be studied and the corresponding saving in structure-weight can be used to the advantage of the machine in load carried or performance, which is desirable from the point of view of quick take-off with a view to clearing trees or obstacles on the banks.

HANDLING.

The present methods of handling seaplanes, in launching and bringing them ashore, can be described as deplorable, and until these methods are improved they must be a bar to their commercial use except in certain special cases.

I refer to the use of inclined slipways coupled with beach axles. The machine is brought up to the slipway and a special beach axle shaped to the bottom of the float or hull is attached in position underneath it by men in waders. The machine is then hauled ashore by winches or man power. The reverse occurs in launching and the machine is retained on the beach axle for handling on land

For small or large machines the method has hardly been improved in 10 years and the resulting damage to machines and the expense of operation accounts for the unpopularity of seaplanes for certain operations and for their nearly prohibitive cost.

For small machines in sheltered water the tidal slipway designed by Mr. Oswald Short is one of the best and most practicable methods. In this a pier extends out into the river or harbour and attached to its end is a floating pontoon of such size that when a seaplane is alongside the wing-tip clears the pier. The pontoon is anchored to the pier but arranged to rise or fall with the tide. A crane with sufficient throw on the arm launches the machine in the water clear of the slipway so that the machine can be brought up in any state of the tide for loading or unloading without the use of waders or undue amount of labour.

One of the greatest advantages of the amphibian lies in the fact that it can be taxied under its own power up or down the slipways and so gets over the principal difficulty of the ordinary seaplane. For pure seaplane purposes the amphibian has disadvantages of weight and head resistance. It would seem possible for ordinary seaplanes to mount small wheels in the floats of insufficient size to cause serious resistance in the water, to be used in place of the beach axle. These wheels would not be large enough to enable the machine to be used as a true amphibian but would give all its advantages in this respect but without the increased weight or water resistance.

Another very practical suggestion, also due to Mr. Short, is that of the floating shed mounted on pontoons with a hinged slipway projecting into the water. The machine is taxied on to the slipway which can be lifted by compressed air. Similar sheds in which the machine is floated direct under cover are also possible.

For large machines with proper anchorage there is no need to bring them ashore after every flight but as such machines are preferably housed under cover it would be a great advantage to construct stations with canals leading into the sheds with a system of locks for bringing the machines in. It would be possible to arrange for pumping out the basins inside the shed so that the machine could be settled down on the proper-shaped stocks for hull examination. This would have the advantage of getting the delicate hull supported with the machine not exposed to the wind. The original cost of such a station would be repaid by the decreased amount of damage to hulls when handled by present methods.

Although in some situations seaplanes can be moored for long periods, and are best operated from moorings, it is essential that such a mooring should be extremely strong. No anchor of sufficient weight can be carried on the machine itself for mooring a fully-rigged seaplane is analogous to mooring a yacht with the sails set. There is the further objection that considerable water soakage takes place and materially increases the weight of the hull. With improved float-construction and possibly with the use of metal hulls objection may be overcome.

Small machines cannot be moored for long periods and in fact large boats of the F. type have been known to "kite" at their moorings in a gale. Until the mechanical difficulties of reefing or folding wings on the water can be overcome proper housing is essential except in very sheltered places.

The handling of seaplanes on the water, alighting, taking off, and navigating in restricted spaces presents special problems to the pilot. The aeroplane pilot has one landing problem alone—sufficient room and wind direction. The seaplane pilot when head to wind may be dead across a tide of 8 or 10 knots which would be equivalent to landing with considerable drift. It is a remarkable fact that experienced seaplane pilots appear to be able to see the tide even in unknown harbours and to make a correct landing splitting the difference between wind and water speed.

In turning on the water across a wind many seaplanes have characteristic qualities and their particular good or bad features. The torque of the propeller has a considerable influence on the amount of rudder required. It is a characteristic of twin-float machines for the propeller torque to tend to dig one float under water increasing the resistance and causing the machine to swerve.

Many of the problems of operating seaplanes concern the organisation and accommodation of stations rather than the machines themselves and this aspect of the question has been much neglected. Also it must be observed that seaplanes could be much improved in seaworthiness and handling qualities if data from practical experience were available to designers, and this can only come with development under working conditions.

PROBLEMS OF DESIGN.

It is impossible here to deal with even a small fraction of the problems in seaplane design.

Water Resistance.—The principal features that affect the design of seaplanes as compared with aeroplanes are, the water resistance of the hull or floats which in addition to imposing limits on the surface and power loading have considerable effect on the propeller design, and the influence that type, arrangement, and dimensions have on the structure weight. Each type of seaplane has it special problems in stability, control and strength of structure.

It is a characteristic of all usual float or hull forms that the resistance rises rapidly with the speed to an initial maximum known as the "hump" speed after which the resistance falls more or less. As the weight is by then partially air-borne and the propeller efficiency is improving the worst condition in taking off usually rises at or about this speed. Some hull shapes develop two such "humps."

The hump speed has two principal effects on the design. In the first case a margin of power must be allowed so that the machine can pass the hump speed with a reasonable acceleration and this is a limiting factor as to the total weight per h.p. Secondly, it affects the propeller design owing to the necessity for obtaining considerable thrust at

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low speeds with correspondingly bad effect on the top speed of the machine.

Assuming that machine and propeller are designed for taking off on smooth water in a flat calm it will be satisfactory under most average conditions. Conditions likely to prevent the machine leaving the water are either rough water or the case mentioned before of a swell and a flat calm.

This feature of the water resistance is the principal one which limits the design of seaplanes in comparison with that of aeroplanes, for in addition to the necessary power to overcome it, it is impossible to use the most efficient propeller from the point of view of speed and further in order to obtain a high thrust at low speed it is necessary to use a larger diameter than would be the case for the land machine propeller. This reacts on the machine by increased weight of chassis to give the required clearance and the large propeller diameter hampers certain seaworthiness conditions.

This question could be dealt with in two ways. One is by the variable-pitch propeller. Given control of the pitch very much improved results could be obtained and greater loads lifted for a given power. An alternative, and seemingly easier solution, would be the provision of a two-speed gear on the engine, the gear ratios being arranged so as to give maximum engine revolutions (1) at hump speed for the machine (2) at maximum or cruising speed according to which was desired.

This is a course I have been advocating for some time and I would take this opportunity to impress upon engine designers the urgent need of this feature for seaplane work. An engine fitted with an epicyclic gear would be particularly adaptable for this purpose as it would avoid the necessity of a clutch or gear-changing mechanism. The alternative gear could be engaged by means of a brake-band exactly in the manner of a Ford Car and the only necessary operation by the pilot would be to hold in a low gear until the machine had passed the hump speed.

Comparison with the Aeroplane.

In a comparison of performances of seaplane and aeroplane the whole matter is bound up in the question of structure weight and accordingly I have endeavoured by plotting the actual weights of existing machines to show the great advantage that the seaplane possesses in large sizes in this respect and a realisation of the effect of size on structure weight of the machine must always be taken into account in such comparisons.

[Mr. Fairey exhibited a curve taken from weights published in *All the World's Aircraft* showing the structure weight of aeroplanes, twin-float seaplanes, and flying boats as against the total weight. It is not possible to reproduce these curves here, but their nature is adequately indicated in the subsequent remarks thereon.—Ed.]

The curves illustrate the writer's suggestion that the average of advantage lies with the float type for small machines and the boat for big ones, and further that large flying boats should be superior in performance to large aeroplanes, while large float types show enough promise to justify experiment with them.

The aeroplane structure-weight percentage drops slightly for a slight increase in size and then shows a reasonable upward trend. The twin-float seaplane starting at great disadvantage to the aeroplane, which is not surprising considering the great weight of floats when applied to small machines, approaches the aeroplane owing to the lower proportionate weight of large floats and then stops short of both the other curves because there are no large twin-float machines. These curves are plotted not on any theoretical basis but on actual results obtained. It would appear that the float seaplane is gaining on the aeroplane in this respect.

The most striking curve is that of the flying boat. This, starting at a very great disadvantage to the aeroplane, overhauls it in medium sizes and passes it in large sizes and in the biggest machine yet built shows even further improvement with no sign of the curve turning up. In other words the limit for big seaplanes is far from reached whereas that of aeroplanes will obviously be met first. Moreover, it would appear that the bigger aeroplanes get the greater will be the difficulty in this respect. (One large German giant machine has no less than 18 wheels for its support.) The difficulties in handling large aeroplanes are tremendous. They need unduly large aerodromes, which must have a hard surface, and most flat country suitable for aerodromes is of a soft nature, whereas the large flying boat has an unlimited "aerodrome."

It does not need the rate of climb for safety in taking off that an aeroplane does and does not present the same difficulties in handling.

It will be noted that the flying boat percentage structure weight is not so far increasing with the size and that even larger machines could be built provided the necessary engines were available. By natural laws this curve must ultimately turn up again but it does show that the limit of size in boat seaplanes is far from reached and in fact is out of sight.

On the theoretical basis alone there are many reasons why the overall size of both aeroplanes and seaplanes is strictly limited but the practical results obtained appear to indicate that the limiting size is very much larger than would be expected from theoretical conditions. It must be remembered that in none of these curves are safety factors taken into account but this would average out to a certain extent and since the larger machine by its steadier flight has a natural advantage in this respect it is only fair that this should be taken account of in considering the average effect.

In short the curves would appear to show the outstanding advantages that the seaplane possesses over the aeroplane in large sizes. It is not limited by the size of aerodromes or the necessity of clearing obstacles after leaving the ground; it cannot be bogged as large aeroplanes will be on anything but the hardest aerodromes.

Turning again to comparison of performances an examination will show the advantage in performance even at top speed goes to the seaplane in really large sizes.

One other theoretical consideration should be mentioned in view of the fact that the seaplane, unless for use on inland rivers, is not limited by the size of the aerodrome. It would appear that some advantage could be taken of this fact to increase the wing-loading with corresponding effect on the landing speed. Unfortunately for small machines this is not the case. Landing speeds of 45 knots or thereabouts appear to be the practical limit, partly because a running landing is not always possible and the machine must

APPENDIX.

Classified List of Existing Modern Seaplanes.

Flying Boats.

Single Step Type.

	Gross Wt. lbs.	Useful Load. lbs.	Structural Weight. lbs.	%	Wt./ H.P. lbs.	Wt./ sq.ft. lbs.
Besson Triplane ...	1,910	590	955	50	14.5	5.9
N.T. 2.B	3,169	848	1,470	46	14.95	7.1
Macchi	3,540	1,100	1,560	44	14.2	7.3
Farman 450 h.p. ...	6,380	2,200	2,600	40	14.2	7.2
N.C. 4	28,000	12,900	9,800	35	16.7	11.7

Flying Boats.

Two-Step Type.

Supermarine Schneider Cup Winner (1922)	3,274	800	1,110	34	6.9	
Nieuport	3,850	1,325	1,735	45	19	7.6
Dornier	4,400	1,440	1,800	41	23.8	8.8
Savoia S.16	4,620	1,760	1,850	40	16	8.1
Supermarine Seagull	5,680	2,000	2,180	38.4	12.2	
,, Amphibian	5,700	1,960	2,280	40	16.2	
Viking IV ,,	5,675	1,872	2,121	37.4	12	9.4
F.3	11,900	4,250	4,750	39.8	16.5	7.3
P.5	12,055	4,700	4,330	35.8	16.75	
Short Cromarty ...	19,700	7,412	7,310	37.1	18.75	8.77
Felixstowe Fury ...	27,700	11,500	9,200	33.2	15.4	8.75
Atalanta N.4 ...	32,000	11,700	10,300	32.2	12.3	11.1

Float Seaplanes.

Twin-Float Single-Step Type.

P.V.2	1,590	503	787	49.5	15.9	9.5
,, Bis	1,702	491	911	53.5	17	9.5
184 Short	4,500	1,020	2,080	46.3	18	6.5
Ricci R.1.C	10,600	4,000	4,230	40	15	8.2

Float Seaplanes.

Twin Float—Double-Step Type.

P.V.5a	2,518	546	1,217	48.3	12.6	8.1
Fairey Pintail III (Amphibian) ...	4,700	1,350	1,950	41.5	10	10.7
Caudron	6,750	2,000	3,200	47.5	17.4	7.2

Float Seaplanes.

Twin-Float Type, intermediate between the Single-Step and Double-Step Types.

Avro Polar Expedition	1,589	589	687	43.2	18.7	9.23
P.V.9	1,965	561	960	49	13.1	8.65
Avro Viper	2,567	604	1,170	45.5	12.2	7.92
L.V.G. W.II... ...	2,650	650	1,220	46		
Junkers (Duralumin construction) ...	3,120	1,105	1,100	35.4		
L.V. W.I	3,460	810	1,370	39.5		
L.F.G. V.20	3,475	1,275	1,320	38		
Short N.2b	4,938	1,586	1,852	37.5	14.3	7.05
Fairey III.D	5,050	1,650	2,020	40	14	10
,, Atlantic Mark II	7,150	3,100	2,600	36.3	20	10

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have a landing speed low enough to make a semi-stalled pancake landing, and also because the high loading would raise the power required at low speeds because proportionately less of the total weight would be taken on the wings and the old difficulty of the hump speed would be exaggerated. In this respect it is suggested it is not that the landing speed of the seaplane is too low but that of the aeroplane much too high and that for equivalent landing speeds the seaplane is in reality much the safer of the two.

In large machines it is possible that some advantage can be taken in regard to the loading but that remains to be tested on full scale.

There is one other important aspect of the seaplane question. There is a common idea that British designs lead the world. There is enough truth in this to make it dangerous to future progress. Design and construction of experimental machines is only a part of the problem. Principles can be established by research and the arrangement and construction of machines more or less perfected in a few examples, but before seaplanes or aeroplanes become practical propositions, whether for naval, military or commercial purposes, they need a long stage of development. Only practical experience of conditions in operation will provide the designers of the country with data to improve still further all classes of machine, and there is not nearly enough information of this kind available. This applies particularly to seaplanes. Questions of seaworthiness, handling, etc., can only be solved by full-scale experiment. After ten years of seaplane flying there has as yet been no proper comparison of the relative seaworthiness of various types. Such questions as landing and handling in rough seas are still largely a matter of speculation.

A great step in this direction has been made by the recent formation of the Development Squadron of the Royal Air Force, and this scheme should provide exactly what is wanted by the designers if carried out on a sufficient scale.

During the rapid development of the War years the seaplane benefited constructionally by the harder conditions it was obliged to face. To a certain extent it may be said that the aeroplane was improved by enlarging and rolling the surface of the aerodromes. The seaplane having sea conditions to face, naturally evolved as a sturdier structure, and these harder conditions account in part for its greater structure weight. It has now reached a stage when designers are definitely awaiting data before proceeding. They need experience of the large types already built before proceeding to still larger ones.

With reduced structure weights and larger machines the range will be greatly increased, and although by flying overland the commercial aeroplanes may shortly reach India and Australia, if communications are to be established throughout the Empire without crossing foreign territory this work will have to be done by seaplanes, and with proper development I suggest that they are the most promising apparatus for the purpose.

GLIDERS.

By COLONEL ALEC OGILVIE, C.B.E., F.R.Ae.S.

EARLY EXPERIMENTS.

The interest of men in the flight of birds goes back to very early days and numberless men watching birds sailing along with motionless wings have expressed disbelief in the impossibility of such a feat for human beings. There can be no doubt that in several cases, some many hundreds of years ago attempts to glide met with partial success, and such attempts to imitate a bird in gliding flight were the only ones of innumerable efforts with helicopters, beating wings and power-driven aeroplanes, to reach any degree of success at all. It is probably not too much to say that if the early experimenters had not tried to go so fast, they would have made quicker progress and flight would have been accomplished a considerable time before it was.

Nothing is more astounding to a student of aeronautical history than the immensity of the effort in money, in time and in brains of a high order, which has been put into abortive experiments in aeronautics.

The importance of the work of Otto Lilienthal to the progress of aeronautics cannot be over-estimated, in fact he is justly considered to be the originator of the modern flying machine. He was the first genuine experimenter to point out the right path to the solution of the problem and he did so in opposition to the general aeronautical opinion of the day.

When the Wrights took up gliding, they did so purely from a sporting standpoint but they showed from the beginning that they had a very clear grasp of the problem and that they appreciated that the heart of the difficulty was control in the air, both lateral and fore and aft. Their machines were simply made biplanes of ample strength and the design progressed from year to year as knowledge of the requirements was obtained.

Col. Ogilvie contrasted the enormous amount of time, money and ingenuity devoted to the construction of experimental engine-driven aeroplanes by such men as Ader, Maxim and Langley, with absolutely no useful result, with the very considerable progress achieved by Lilienthal, Pilcher, Chanute and finally the Wright brothers with the aid of the cheap and simple glider.

As an illustration he stated that the Wrights spent three years developing controls on their glider and after that one year was enough to build a special engine, design airscrews and make an aeroplane which would fly.

The deduction which Col. Ogilvie desired to make was that the control problem might well not be solved at this present day if it had not been for the availability of the glider as an instrument to get at the fundamentals of the problem in a simple, inexpensive and reasonably safe manner. Once the fundamentals are known, their application to attain practical results is quick and easy.

THE DEVELOPMENT OF PRACTICAL FLYING.

During the war period, lives, brains and money were freely spent to meet the rapidly-increasing requirements, and the expansion in the four years was to be measured in hundreds of fold. If the war had continued for another year or two, it was to be expected, judging by the rapid rate of progress, that the aircraft weapon would have predominated over all others.

From the technical standpoint the necessity of maximum performance in speed, in climb and in weight-carrying was so paramount that other aerodynamic qualities were perforce neglected.

The methods of construction developed in the war period were suitable for the rapidly-changing types, which were produced to meet demands but which were out of date almost before they were in production. As might be expected such construction did not primarily make for reliability, ease of maintenance or for long life.

The aircraft industry under these conditions developed in the most amazing way, but having only one customer found itself in a very difficult situation as soon as the demands of that customer fell off.

Since the war all that the customer has been able to do is to dole out orders just sufficient to keep the industry or part of the industry alive.

Col. Ogilvie mentioned certain technical points of design which had to be neglected during the war. These require investigation now and can be investigated by the use of gliders.

PRESENT POSITION OF AERONAUTICAL DEVELOPMENT.

Col. Ogilvie said further that he was looking at this matter from the point of view of aircraft for civil transport purposes. From this standpoint, the present position of aeronautical development cannot be considered to be satisfactory.

Civil aircraft are not sufficiently safe in the event of a breakdown of the motive power necessitating a forced landing.

Civil aircraft are also much too expensive to buy, to run and maintain in running order and until very considerable improvements can be effected it cannot be claimed that they are transport vehicles of a really commercial character.

It is hoped that these remarks will not be misinterpreted. Col. Ogilvie believes firmly in the future of civil aviation and in the capacity of our aircraft industry to find an answer to the many problems involved.

The size of commercial aircraft is so great that the cost of building machines for experimental purposes is practically impossible to private firms, apart from the cost of the large quantities of fuel required, of the maintenance parties and of the large shed accommodation and other overheads.

State support of the experimental work of private firms means a measure of control of that work and it is not and cannot be really satisfactory because the man who has initiated and is conducting the experiments must be free to follow out his own ideas.

The position is therefore somewhat of a deadlock. It is impossible to make rapid progress towards a really sound economic aircraft without a large volume of experimental work, the cost of which if conducted with full-scale civil aircraft is so great as to be altogether beyond the capacity of the transport firms or of the industry.

RECENT EXPERIMENTS WITH GLIDERS.

After this short account of the general aeronautical position, we can return to the subject of this paper and briefly review the glider experiments of the last few years.

[The paper then briefly refers to the history of gliding in Germany during the past few years and to the recent French and British contests. These details are well known to all

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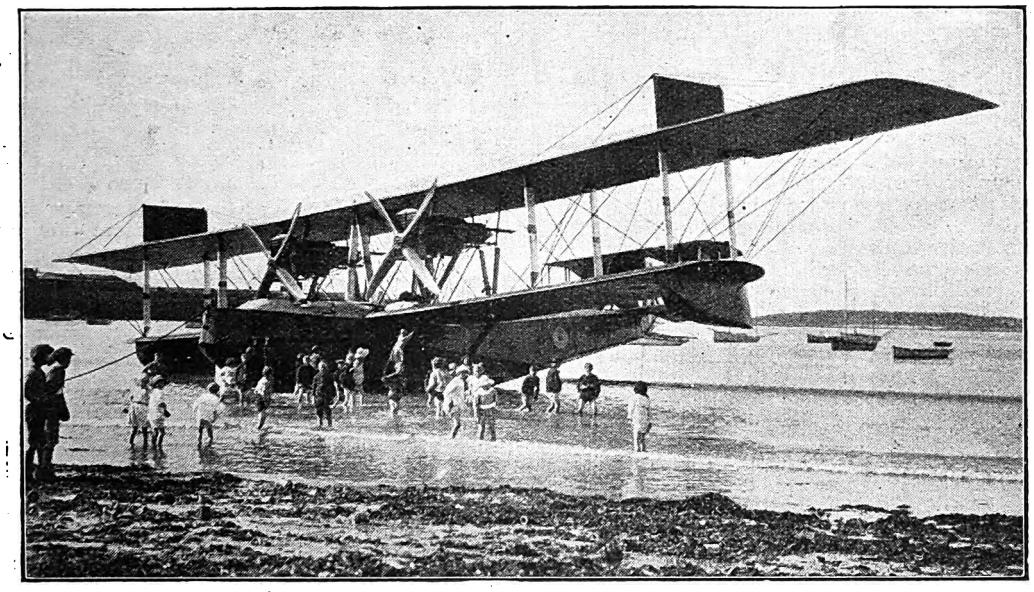

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readers of The Aeroplane and need not be reprinted here. The concluding remarks referring to the Itford competition are given however.—Ed.]

Within two days of the opening of the Itford contest a flight of nearly two hours had been made on a British monoplane and before the end of the week the German record had been beaten in a flight of 3 hrs. 20 mins. by a French machine.

The landing was made almost in the pitch dark, and when it is considered that the type of machine was a most unconventional one with a novel form of control and that its only previous glide had been one of a few seconds, there can be no doubt that this performance was a very remarkable feat on the part of the designer and the pilot and one most significant of the possibilities of the glider.

As events turned out, the competition was one of controllability rather than of efficiency, and meritorious as were the British machines in some respects, it was evident that there was room for improvement in controllability.

As far as the writer is aware none of the competitions has demonstrated what is the true gliding angle or overall efficiency attainable in a glider. All that can be said is that one machine looks better than another in this respect. It has been said that there are gliders whose angle of descent is 1 in 15 or even 1 in 20 but the writer has seen no proof as yet than any glider has accomplished in fact an angle even as good as 1 in 12.

Limitations and Usefulness of Gliders.

There would appear to be very little likelihood that engineless aeroplanes can ever be of practical service in journeying from place to place or even that they will be much used for sport. The necessity of an up-current of some kind to support the machine renders the first almost impossible and confines the second to special localities. The sport of motor-cycling would be a tame affair if it was limited to hill-climbing up special hills.

[The sport of motor-cycling at least originated at a time when it was confined to climbing no hills at all.—Ed.]

There are possibilities in the use of gliders for purposes of training pilots and there are certainly possibilities in the development of small sporting machines of 15 to 20 h.p. capable of horizontal flight with 5 h.p. and doing 100 miles or so to the gallon, but the real immediate value of gliders lies as it always has done in the opportunity they afford of technical experiment in a simple and inexpensive manner.

In experiments with engine-driven aeroplanes, the horse-power of the engine and the efficiency of the propeller are always difficult to estimate exactly. The detail design has to be carried out with care and attention in order to keep the weight of the structure within fairly close limits, while the cost of the experimental work is almost prohibitive to private firms.

On the other hand, with gliders the motive power, which is the force of gravity, is perfectly definite in amount and always reliable and for many purposes the machine can be built in a simple rough-and-ready manner as long as the external form is correct.

As indicated above, there are two main technical problems in the commercial aeroplane of the day and it is suggested that solutions of either or of both are more likely to be found by means of experimental work with gliders than by other means.

The first is the increasing of aerodynamic efficiency. The overall efficiency, the ratio of lift to drag, of the commercial aeroplane of the day is about eight to one, in some cases even less. About 60 h.p. is required to carry each individual passenger for the usual three-hour journey at the speed necessary to combat the normal wind conditions. This obviously very high figure gives an indication of the reason for the high cost of aerial transport. In addition to the heavy fuel costs entailed by this poor efficiency there are heavy capital and insurance costs, all of which would come down if the overall efficiency could be increased, as it is perfectly certain it could be provided that an adequate amount of experimental work can be done.

The second problem for solution is the improvement of controllability at low flying speeds, so that in the event of an engine stoppage, the aeroplane can be landed in awkward fields with greater safety than at present.

It is well known that an aeroplane the stalling speed of which has been tested to be say 50 m.p.h. in good weather on a large aerodrome is never, in the event of a forced landing, glided in at a speed of less than 60 m.p.h. This additional 20 per cent. over the stalling speed adds greatly to the difficulties of the landing and to the shock in the case of an accident and would be entirely unnecessary if the pilot had an aeroplane over which even in gusty weather he had complete control right down to the stalling speed. This difficulty is such a commonplace among pilots that it does not occur to them to worry about it, but it is a problem to which a great deal of attention is being paid and to an attack on which the Aeronautical Research Committee is devoting a considerable amount of the resources at its disposal. The recent gliding competition at Itford Hill showed how much room there was for improvement in the controllability of the aeroplanes entered and instilled a belief that other competitions would cheaply and quickly effect such improvement.

There can be little doubt that these are only two instances out of many where we have good reason to expect substantial progress in aeronautics by means of experimental work with gliders.

The writer would conclude by an appeal to business men who are interested in civil aeronautics, whether from a financial point of view or otherwise, to put up prizes and so to stimulate competition among a large number of brains towards a solution of the problems which must be solved before commercial aviation can become a practical economic proposition.

THE SECOND DAY'S PROCEEDINGS.

The second day of the Conference was devoted entirely to the discussion of the papers read on the previous day. The Chair was taken by the Duke of Sutherland, Under Secretary for Air. He made the devastating suggestion that it would be a good thing if in future years these Conferences lasted for three or four days. Considering that everybody concerned with aviation regards the Conferences as pure waste of time, mitigated only by the fact that owing to the Conferences aviation receives a certain amount of newspaper publicity which it would not otherwise get, one can only suggest that this latest and youthful recruit to aviation should be persuaded of the error of his ways before he has time to put his horrible ideas into concrete form.

Waste of Time.

Nothing is ever said at these Conferences which could not be said much better and much more fully and generally much more amusingly at the meetings of the Royal Aeronautical Society, and at these Conferences one has in addition to suffer long discourses from people whose chief idea seems to be to get themselves noticed in the Press. Really able papers such as those which composed the first day's work of the Conference would receive just as much newspaper attention if delivered on various different dates to the Royal Aeronautical Society always provided (a) that a sufficiently distinguished chairman were secured, (b) that the meetings were held at a reasonable hour which did not kill both the afternoon and the evening as they do at present and (c) that the general publicity of the Society in relation to the non-technical Press were operated a trifle more actively than it appears to be at present.

Matters of these kinds are essentially the affair of the Royal Aeronautical Society but unfortunately that Society appears to be at present falling into a state of innocuous desuetude almost comparable with that of the Air League. In any case one is perfectly sure that the majority of the people in the Aircraft Industry cannot afford to waste three or four days over useless discussions but purely for advertising purposes it is obviously necessary to each individual in the Aircraft Industry that he should attend these Conferences. Nobody goes because they want to go, they only go because their absence might be taken as an indication that they are "not in the movement," and anyhow no aircraft constructor can afford to ignore an Air Ministry invitation.

At any rate it is evident that the Duke of Sutherland means well and he is delightfully frank about knowing nothing about his job, which is always an extremely hopeful and helpful sign. Also he has a very nice sense of humour, for he terminated his introductory remarks by referring to the fact that he had so recently succeeded Lord Gorell and remarked that he hoped that in this connection people would not recall Commander Burney's remarks apropos airships that it was "so easy to change gasbags." His ingenuousness and ingenuity must result in everybody wishing him well in his new job.

A Pious Resolution.

The discussion was opened by Mr. Holt Thomas who as on a previous occasion said that the Conference would not be much use unless it passed a resolution to which the Cabinet would pay attention. He moved the following resolution:—

> "In view of the necessity of increased rapidity of communication within the Empire and in view of the progress made by other nations in civil aviation, this Conference calls upon the Government to give due and immediate consideration to the foundations of an air mail throughout the Empire."

This was seconded by Admiral Mark Kerr and carried without noticeable dissent.

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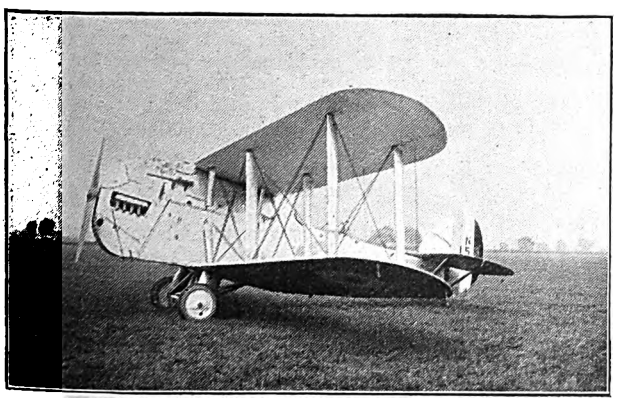

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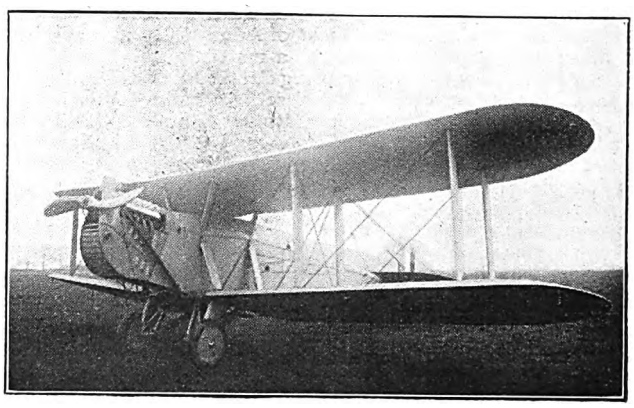

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LORD GORELL'S VIEWS.

Lord Gorell, the previous Under Secretary for Air, said that the three main routes on which air transport in this country must go at any rate till Atlantic flying became possible were those to Paris, Constantinople and Moscow. With this one may agree, at any rate until such time as the war with Russia begins though one is doubtful whether the London-Moscow Air Line will ante-date the said war.

Referring to Comdr. Burney's paper [this will appear in THE AEROPLANE next week] he noticed that throughout the later half of this Commdr. Burney spoke entirely of the Admiralty. The scheme had been submitted last August to the Admiralty but was referred to the Air Ministry. He asked whether it was not rather an unusual proceeding when you wished to take over Mr. Jones's house that you should go to Mr. Smith with the proposal. The whole of the paper seemed to establish the rivalry between the aeroplane and the airship in its most harmful form. He regretted that airships should be used as a stalking horse to attack the Air Ministry's control of the air. He wanted to see air policy like foreign policy placed right outside party politics.

With reference to air transport he agreed with Mr. Holt Thomas that it was not desirable to put too much stress on passenger traffic. They should concentrate on transport. He could not understand why our Post Office did not follow the American plan and send letters by the quickest method, the aeroplane, without charging extra to the public. The Post Office ought to send letters by the quickest route without asking senders which method they wished.

MR. HANDLEY PAGE believed that profit could be made out of passenger traffic and that passengers would always pay better than goods. He hoped that under the new subsidy scheme due attention would be given to research with a view to helping civil aviation. A very important matter was to level up the traffic between summer and winter. He emphasised the fact that insurance premiums had been reduced recently in consequence of freedom from claims by the air lines.

GENERAL SEELY advocated eliminating noise from aircraft as it had been demonstrated that the functions of the human brain were impaired by loud noises and every day the pilot had more tasks to perform at the same time.

MR. ASHBOLT, High Commissioner for Tasmania, called for the full publication of the report of Mr. Amery's Commission on Airships. The Dominions had not been fairly treated and it was rumoured that the Committee was strongly in favour of the scheme submitted.

ADMIRAL MARK KERR said that for £10,000,000 of the £16,000,000 which we were spending on battleships which would never go properly into action we could make ourselves safe in the air. The people of this country should be made to understand the simple laws of strategy that everything depended on speed and range. The speediest and longest-ranged weapon was the aeroplane. The only way to get anything done was to frighten the people of this country and let them frighten the Government.

He said that commercial aviation should be assisted by the Government in order to maintain the reserve for the Air Force and that our air power would be built on our commercial air fleet as was the case with the Navy.

[One is surprised at on officer of Admiral Kerr's experience making this common error. As a matter of fact the Mercantile Marine grew out of a fighting fleet. In or about 400 A.D. the then pro-Consul of Britain self-determined this country as a State independent of the Roman Empire. He built a fighting fleet, swept the Channel and the Noth Sea clean of Teutonic pirates and then proceeded to build merchant ships with which he traded all the way from Calais to Gibraltar. Prior to that our coastal trade had been carried on by foreigners from the Continent. After the break-up of the Roman Occupation of Britain we again lost our Mercantile Marine and it was again established by King Alfred who built a fighting fleet first and a merchant fleet afterwards. In each case the people of the Mercantile Marine learnt to sail and fight in the fighting fleet. Which is what must happen in aviation. Under existing conditions for pilot's certificates and even for ground engineers' certificates it is practically impossible for a civilian newcomer to put in the necessary amount of flying or to get the necessary amount of experience unless he has first been in the Air Force and has acquired his experience at the Government's expense.]

GENERAL WILLIAMSON of the Post Office said that the use of the air mails had declined [which seems perfectly natural considering their inefficiency]. The Government could not be blamed for the failure of the air post or because local chambers of commerce did not inform their members of the existence and uses of the air mails. The Post Office had distributed to business houses in London alone 250,000 copies of a summary of air mail facilities, practically without result.

The parcel post to Paris had been a great success. It had increased 200 per cent. in September as against the corresponding quarter in 1921. The Cairo-Baghdad mail showed a 600 per cent. increase but an income of £200 per trip did not go far towards paying for an 800-mile journey.

Air mails could only be useful over long distances and when operated at night. London letters posted after office hours ought to be delivered in Copenhagen and Stockholm next day.

SIR HENRY WHITE SMITH emphasised the need for research and experiment to get efficient commercial aeroplanes. They had to discover whether big or small machines were better and whether it would pay to use heavy engines with infrequent overhauls or light engines demanding constant attention. He remarked humorously that a succession of Air Ministers had at any rate the advantage that so many Members of the House of Lords and the House of Commons thus received an education in aviation.

GENERAL BRANCKER replying to criticisms of his paper said that he did not deserve the bouquets which had been bestowed on him instead of criticism. He thought that Colonel Ogilvie and Mr. Fairey both harped too much on engine failure. What he wanted was to make engine failure impossible. He did not believe in the need for slow-landing machines. He believed in machines that did not have to land except at proper places.

With reference to the Air Lines he said that the Supermarine Company were shortly starting a sea service to Cherbourg, the first subsidised sea line.

He paid a neat compliment to Mr. Holt Thomas who, he said, had not only initiated air lines but had been the first to establish International Co-operation and he believed that it was he who suggested the Civil Aviation Advisory Board. [Here General Brancker is wrong, for in fact that Board was suggested to Captain Guest by Mr. Baldwin Raper.]

As to the uses of Civil Aviation General Brancker recalled that on one occasion he had been dancing in London at 2 a.m. and had presided at a meeting in Paris at 10 a.m.

[One presumes this is an example of General Brancker's dual existence to which Colonel Moore-Brabazon referred at the Aero Club Dinner.]

Further General Brancker complimented Mr. Handley Page on the reliability of his machines on the Paris service but pointed out that on several occasions H.P. machines had exceeded the statutary four hours on the journey and so had had their subsidy cut off for those journeys. He remarked that machines that took four and a half hours to go from London to Paris were very little use.

[One is under the impression that on most of the occasions when Handley Page machines exceeded the statutary four hours they were the only machines which got through at all. On those days other machines stayed at home and so saved their running expenses. It is a fact that relying on their two engines and their slow landing speed Handley Page pilots will start in weather when the pilots of the majority of other machines prefer not to start.]

Continuing General Brancker remarked that it had yet to be decided whether the small unit was not better for a small volume of traffic. Then as more traffic developed they could put on more units. At the present moment tenders had been demanded for three experimental transport machines suitable for (a) European work, (b) use on the route to India, and (c) non-stop journey from London to Malta.

Referring to parachutes he said that they were undoubtedly good for war but he could not see any use for them in civil aviation. So far as could be traced no fatal accident had occurred in Civil Aviation in which a parachute could have been of any help. [With which sentiment one cordially agrees.]

Concluding General Brancker said that he had carefully avoided any reference to the relation between civil and military aviation

[This concluded the discussion on the air transport side of the Conference. It is proposed next week to deal with the discussion on the technical side.—C. G. G.]

A MATTER OF EXCHANGE.

As already mentioned in this paper it is impossible, in the existing state of the exchange for German aeronautical enthusiasts to subscribe to British aeronautical papers. At the same time, owing to the considerable variation of the exchange, British subscribers to German papers are liable at any moment to be informed that the price in marks has been multiplied and that therefore their subscriptions have lapsed.

It is undoubtedly mutually to the advantage of British and German students of aeronautics that each should study the technical papers of the other's country. The best way of doing this seems to be for subscribers to British technical journals to exchange their copies when they have read them for copies of the German papers. Therefore one would be glad to hear from any readers of THE AEROPLANE who would like to arrange an exchange with German aeronautical students. Several such exchanges have already been arranged.

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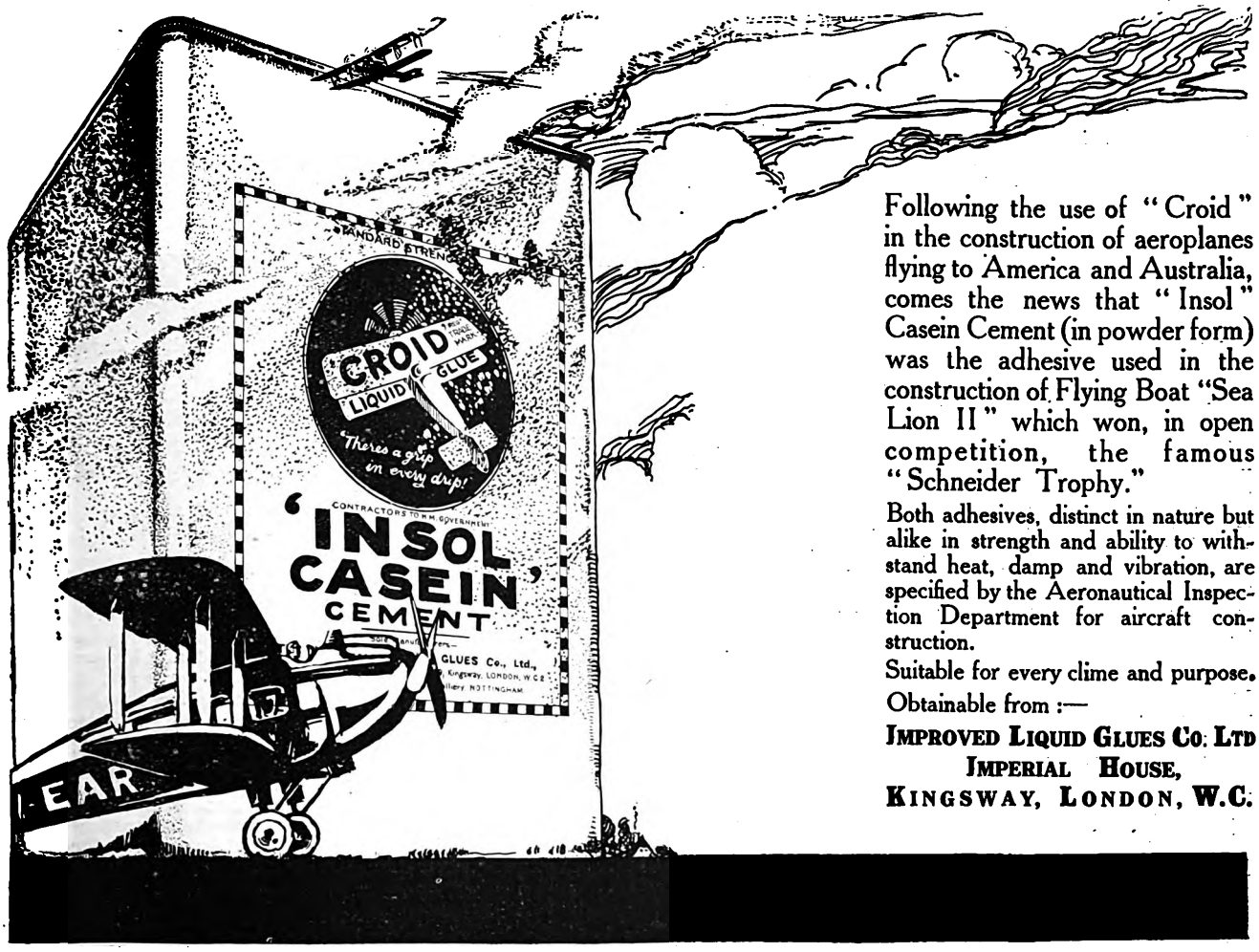

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R.A.F. INTELLIGENCE.

Appointments.

From "*The London Gazette*," Feb. 6th.

R.A.F. General Duties Branch.—The following Pilot Officers to be Flying Officers: P. W. Adams, E. B. Addison, E. J. Dashwood, A. M. Glover, A. L. Harris, G. P. F. Hills, E. C. N. Jeffries, R. P. Mollard, G. C. Slater, F. K. Wright (Dec. 28th, 1922); S. H. Cooper, B. J O'C. Hanstock, R. C. Wansbrough (Jan. 4th); R. H. Mahon, T. J. Shaw (Jan. 5th); F. G. Whitmore (Jan. 8th).

S/Ldr. (Acting Group Capt.) F. H. Moody, M.C. (Maj., Indian Army) relinquishes his temp. commn. on return to Army duty (Jan. 15th); S/Ldr. S. C. Winfield-Smith, D.S.O., is placed on the retired list on account of ill-health contracted in the Service (Feb. 7th); F/O. M. J. Langley, D.F.C., is removed from the R.A.F., His Majesty having no further occasion for his services as an officer (Jan. 23rd).

Air Ministry, Feb. 9th.

General Duties Branch.—Air/Commodore L. E. O. Charlton, C.B., C.M.G., D.S.O., from R.A.F., Depot to H.Q., Iraq Command, 2/2.

S/Ldrs. E. H. Johnston, O.B.E., from No. 24 Squadron to command No. 30 Squadron (Iraq Command), 13/12 (substituted for the notification concerning this officer dated 20/12); A. T. Harris, A.F.C., from H.Q., Iraq Command, to command No. 45 Squadron, 20/11; A. A. B. Thomson, M.C., A.F.C., from No. 39 Squadron to Armament and Gunnery School, 26/2.

F/Lts. T. Henderson, M.C., A.F.C., from No. 100 Squadron to No. 1 School of T.T. (Boys), Halton, 2/2; G. C. Anne, O.B.E., from Depot to Air Ministry (Dept. of A.M.P.) (D.D.P.), 9/1 (substituted for the notification concerning this officer dated 26/1); C. P. O. Bartlett, D.S.C., from R.A.F. Depot to School of Naval Co-operation and Aerial Navigation for duty as Adjutant, 1/2; C. K. Chandler, M.B.E., from No. 267 Squadron, Mediterranean Group, to H.Q., R.A.F., Middle East, 27/1; R. A. Young, from Air Ministry (Dept. of A.M.P.), (D.D.P.) to R.A.F. Depot (Supernumerary), 9/1; P. Huskinson, M.C., from R.A.F. Cadet College (Flying Wing), Cranwell, to Armament and Gunnery School, 26/2; E. J. Cooper, D.S.C., from Marine and Armament Expert Estab. to Armament and Gunnery School, 26/2; B. J. W. Brady, D.S.M., from No. 1 School of T.T. (Boys), Halton, to Armament and Gunnery School. 26/2; A. W. Fletcher, D.F.C., A.F.C., from H.M.S. "Argus" to R.A.F. Base, Leuchars (No. 203 Squadron), 27/1.

Medical Branch.—F/Lts. V. R. Smith, from Central Medical Board to H.Q., R.A.F., Middle East (Supernumerary), 24/1; E. F. N. Currey, from R.A.F. Depot to Central Medical Board, 5/2.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

Hockey.

R.A.F. v. The Army.—The R.A.F. played the Army at hockey at Halton on the 7th inst. Although defeated by six goals to three, the Air Force team put up a better show than they had ever previously done in an inter-service game.

The Army at once took the lead, and a very fine run by Parslow let King score. The Army pressed again, but Roupell cleared finely. A period of pressure by the R.A.F. almost ended in Saint scoring, the ball just going behind. The Army came away again, from a melee in front of the goal, King pushed the ball through. After this came a period of pressure by the R.A.F., Wiblin putting in some fine work, though he was a trifle slow in getting away. At last the pressure by the R.A.F. resulted in Saint scoring off a pretty pass from Robinson, a very good goal.

The R.A.F. pressed at the restart, but very fine work by Hill transferring the pressure to the other end. A very fine bout of passing by the Army forwards resulted in Cork scoring a good goal. Then the R.A.F. pressed hard, and some good work by Robinson was seen on the right. A fine pass by Wiblin allowed Saint to score again, and five minutes later Wiblin gave Robinson a perfect pass, off which he scored.

The following are mentioned as showing outstanding merit: —Smyth, Wiblin, Roupell, Robinson, Sawyer, Gilley and Saint.

Final Score: Army 6 Air Force 3.—The team was as follows:—F/Lt. Gilley (Staff College); L/AC. Davenport (No. 1 F.T.S.) and P/O. Roupell (No. 2 F.T.S.); W/Cdr. Bromet (S. of N. Co-op.), F/O. Scott-Davidson (Depot) and F/O. Smyth (S.T.S. Lee); F/O. Sawyer (Grain), S/Ldr. Robinson (I.A. Hq.), F/O. Saint (R.A.E.), P/O. Reeves (No. 2 F.T.S.) and P/O. Wiblin (No. 39 Sqdn.).

Cranwell.

R.A.F. (CADET) COLLEGE, CRANWELL, Rugby XV Results—1922: December 2nd, v. Nottingham, home, won 11—8; December 6th, v. Pembroke College, Camb., away, lost 3-27; December 13th, v. Nottingham, away, lost 3—8; December 16th, v. R.M.A., Woolwich, away, lost 8—19.

R.A.F. (Cadet) College, Cranwell v. R.M.A., Woolwich.—Woolwich beat the R.A.F. College, Cranwell, at Woolwich, on Saturday, December 16th, 1922, by two goals and three tries to one goal and one try (19 points to 8). It was a splendid match. The "Shop," with a following wind—it was blowing stiffly from the south-west—scored a goal and a try before "change"; then, in the second half, Cranwell made the points even. For a long while it was "touch and go" for both sides; but in the last ten minutes the heavier Woolwich forwards wore down Cranwell; the three-quarters, who had always looked dangerous throughout the game, brought off some very good passing movements, and three tries resulted, one of which was converted into a goal.

The two packs were evenly matched up till that time, but it was the superiority of Woolwich outside the scrum that won them the match. The tackling on both sides was keen and hard, as was also the falling on the ball. If special commendation should be given to any individual players, it should go to North Carter, the Cranwell scrum-half, who played a wonderfully stout game throughout, and to G. A. Young, the Woolwich full-back, who was brilliant in all branches of his job.

The team was:—P. R. Meredith; C. C. Edwards, L. W. Dickens, E. Davis and H. H. Brooks; N. Carter and R. B. Jordan; F. S. Harris, F. V. Beamish, H. R. D. Waghorn, G. L. Worthington, H. R. F. Baxter, W. O. Du Port, M. D. Ommanney and B. D. J. Broadway.

R.A.F. STATION, CRANWELL.—Rugby XV Results—1922: November 25th, v. Lincoln R.F.C., away, lost 5—3; November 28th, v. Oundle School, away, won 17—3; November 29th, v. Halton R.A.F., home, lost, 11—3; December 16th, v. Melton Mowbray R.F.C., home, won, 9—5. 1923: January 20th, v. Nottingham Town, away, lost 6—3.

R.A.F STATION, CRANWELL.—Hockey Results—1922: November 25th, v. No. 100 Sqdn., Spittlegate, home, won 6—0; December 2nd, v. Boston 1st XI, home, won 2—1; December 2nd, v. Boston 2nd XI, away, draw 3—3; December 9th, v. Newark, away, won 4—3. 1923: January 20th, v. Lincoln Depot, away, won 3—0.

R.A.F. Hockey Association Inter-Unit Cup.—January 24th, R.A.F. Station, Cranwell, v. No. 5 F.T.S., Shotwick, away, won 8—1.

Soccer XI Results.—*South Lincolnshire League*:—December 2nd, 1922, v. Boston St. Nicholas, home, fon 4—1; December 16th, 1922, v. Grantham St. John's, away, won 6—2; January 20th, 1923, v. Spalding, home, won 3—0; January 27th, 1923, v. Spittlegate R.A.F., home, won 6—0.

Lincoln Wednesday Amateur League:—November 29th, 1922, v. Gainsborough Athletic, home, won 7—1; December 13th, 1922, v. Gainsborough Athletic, away, won 8—0; January 17th, 1923, v. Gainsborough Wednesday, away, won 11—0.

Lincolnshire Junior Cup:—December 9th, 1922, v. R.A.F., Spittlegate, away, won 4—1; January 13th, 1923, v. Spalding, away, won 4—1.

Soames Cup:—November 25th, 1922, v. A. and J. Shaws, Ltd., away, won 3—2; February 3rd, 1923, v. Kirton, away, won 5—1.

R.A.F. Cup:—January 23rd, 1923, v. R.A.F., Spittlegate, home, won 2—0.

BOYS' WING, R.A.F., CRANWELL.—Hockey Results—1922: November 25th, v. Rushtons Works, Lincoln, home, won, 2—1; December 2nd, v. Boston 2nd XI., home, draw, 3—3. 1923: January 13th, v. Stamford, home, won, 5—1; January 20th, v. Newark Town, home, won, 3—1.

Rugby Results.—1922: November 25th, v. Newark 2nd XV, home, won, 41—0; November 29th, v. Spittlegate, home, won, 10—0; December 2nd, v. Stamford Grammar School, home, won, 14—6; December 9th, v. Newark 2nd XV., away, won, 3—0.

Soccer Results.—December 6th, v. Halton Boys, home, won, 3—1.

(Unofficial.)

R.A.F. v. Blackheath.

Playing at Blackheath on February 10th, against Blackheath, the R.A.F. were beaten by a dropped goal and a try (7 points) to nil.

The Air Force were without Wakefield and Lowe both of whom were usefully employed at Leicester helping to put the Irish in their proper place.

In the early part of the game the Air Force were getting the ball but lack of combination among the backs destroyed the advantage. Even allowing for the greasy state of the ball the handling of the three-quarters was bad and knocks-on were far too frequent. Individually Bryson played a good game and with any luck would have scored in the second half following a fine run down the field.

About half way through the first half the R.A.F. forwards lost what pull they had in the beginning and although they did some remarkably good work in the loose they weren't heeling out quick enough and Blackheath getting the ball the Air Force had to fall back on defence. Here they showed up well. Blackheath started some beautiful passing movements but the R.A.F. tackled hard and low and so the Blackheath three-quarter line swallowed their own mud. Just before half-time the Blackheath full-back opened the scoring with a dropped goal.

In the second half the R.A.F. forwards made a fine rush headed by Simpson to the Blackheath line forcing the latter to touch down. Bryson then made the great run previously

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mentioned and for several minutes the R.A.F. seemed bound to score. The attack failed however and shortly afterwards Blackheath scored the only try of the match.

The Air Force full-back, Runham, played a great game, fielding safely and finding touch with good long kicks. His game was very different from that which he played against Guy's.

The R.A.F. team were :—L/AC. Runham; L/AC. Snaith, F/Lt. O. C. Bryson, F/Lt. C. B. Riddle, and F/Lt. H. G. White; AC. Miller and F/O. T. Rose; F/Lt. R. H. C. Usher, F/Lt. S. P. Simpson, S/Ldr. J. D. Stephens, F/O. C. D. Adams, F/O. J. S. Chick, F. Sjt. Smith, P/O. E. B. Coventry, and AC. Collins.—C. M. MC. A.

PERSONAL NOTICES.

BIRTHS.

CHRISTIE.—On Feb. 7th, at Cairo, to Helen, wife of F/O. H. L. Christie, R.A.F.—a daughter (Jean Lindsay).

VAN RYNEVELD.—On Feb. 6th at the Trelawney Nursing Home, Pretoria, South Africa, to Enid, wife of Col. Sir Pierre van Ryneveld, K.B.E., D.S.O., M.C.—a son.

WADLEY.—On Feb. 7th, at Ramleh, Palestine, Kitty (née Fairlie), wife of Accountant Officer Wadley, R.A.F., Ramleh—a son.

MARRIAGES.

LUDLOW-HEWITT—ASHLEY.—On Feb. 3rd, at St. Marylebone Church, by the Rev. W. D. Morrison, D.D., Group/Capt. Edgar Rainey Ludlow-Hewitt, C.M.G., D.S.O., M.C., A.D.C., R.A.F., second son of the Rev. T. A. Ludlow-Hewitt, of Clancoole, Bandon, and Albinia Mary, widow of Capt. Henry Ashley, Coldstream Guards, and elder daughter of Mr. and Mrs. Evans-Lombe, of Marlingford Hall, Norwich.

SCOTT—BROWN.—On Feb. 10th, at Emmanuel Church, Southport, Walter Somerville Scott (late R.A.F.) to Edith, eldest daughter of Mr. and Mrs. A. B. Brown, of 19, Leyland Road, Southport.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS ND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Feb. 11th :—

LONDON—PARIS :

Handley Page Transport, Ltd, machines 6*, passengers 30; De Havilland Aircraft Company (Night and Special Service), machines 5, passengers 9; Air Union, machines 5†, passengers 14; Total machines, 16, passengers 53.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 12*, passengers 52. Daimler Airway, machines 2, passengers 10.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 10, passengers, Manchester-London, 8, London-Amsterdam, 10.

LONDON—ROTTERDAM :

K.L.M., machines 10, passengers 11.

Total number of trips by British machines : 35, carrying 119 pas.

Total number of trips by foreign machines : 15, carrying 25 pas.

Trips per day.—Monday, 5; Tuesday, 9; Wednesday, 6; Thursday, 4; Friday, 15; Saturday, 13, Sunday, 4.

STATISTICS.

Machines, 50; Passengers, 144; Crews, 87; Total Personnel, 231.

Corresponding week last year :—

Machines, 54; Passengers, 92; Crews, 87; Total Personnel, 179.

Corresponding week, 1921 :—

Machines, 22; Passengers, 25; Crews, 27; Total Personnel, 52.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

THE A.D.C.

The A.D.C. were busy on Monday during the visit of the Air Conference members and they had four machines in the air. Later on after the members had left Mr. Perry tested a couple of Tinsydes. On Tuesday, Thursday and Friday Mr. Perry was up on the "Tinsyde" with the boosted Hispano engine and also on the one fitted with two Lamblin radiators. Both machines have a very good performance.

THE AIR LINES.

The Air Lines have had quite a good week and there was only one blank day. Five machines started out on Monday, but owing to fog in the Channel only one machine got through, a D.H.34, piloted by Cyril Holmes, from Cologne.

Mr. Cobham, with Mr. Biddlecombe, and a member of the Press Association, attempted to make a night journey to Paris in the evening and left Croydon at 18.18 hours. They were compelled to land at Lympne by fog.

Mr. Dismore made a quick trip in a W.8b on Tuesday, getting through in just over two hours.

HARLEQUINADE.

On Friday, the Harlequin Rugger team left for Cologne per Instone Air Line to play the British Army in Cologne. Owing to the demand for seats to Cologne due to the French and German peevishness causing rail disorganisation, the Daimler Airway diverted one of their D.H.34s to Cologne to cope with the extra traffic.

On that day the Daimler Airway had all their four machines and pilots in the air together. In addition to the Cologne machine, one 34 was flying to Amsterdam, another one from Amsterdam, another to Manchester. The Cologne machine returned on Sunday as did the two Instone machines.

A propos the recent Daimler forced landing at Northampton the machine flew back to Croydon within 36 hours of the event. A lorry with a new Napier was sent up and the engine was changed with the help of a pulley and shear-legs.

BROADCASTING.

On Friday Mr. Broad left Croydon at 20.00 hrs. on the night flying D.H.9 with Mr. Biddlecombe and got to Paris successfully in 2 hrs. 53 min. Amateur wireless people could hear Le Bourgêt calling "Allo Beedlekom" distinctly.

The Hall and Brenard Wireless Company is going very strong. They are selling quite a good little crystal set on which the London concerts can be heard well. Complete with aerial, phones, insulators, etc., the set costs under £3 and is well worth having to those making a start in this fascinating pastime. The address of the firm is 10, Manor Gardens, Purley.—G. D.

Brooklands.

There has been quite a lot of flying at Brooklands during the past week or so. On Sunday, the 4th, the Vickers "Vixen" was taken up for the first time. She looks a neat job in the air, and appears to be fast and very manœuvrable. The machine was further tested later in the week.

On the Monday the Handasyde H.2 monoplane had another trial flight. Coming towards one at a distance she is very reminiscent of the pre-war Handasyde monoplanes. At the same time a "Viking" was sedately flying round, and the contrast was very striking. The new monoplane built by the H. G. Hawker Engineering Co. will be tested here very shortly, probably about the end of the week. One hopes to know more about these machines soon.

According to a local paper, and current gossip, Mr. Raynham flew from Bristol last week on "a new machine" to Guildford in order to be in time to compete in a Badminton tournament there. He is said to be almost as skilful at this game as at handling an aeroplane.—J. F. S.

[This was evidently the Bristol on which Mr. Raynham left for Madrid on Saturday week. One believes that Mr. Raynham is most devastating at Badminton.—Ed.]

SHOREHAM AERODROME RE-VISITED.

With slow uneasiness I reached the shed :
So desolate it was, and at my tread
Rang harsh and loud : the echoes tried to find
Some hiding place : and everywhere there moved
Pale memories, and ghosts that once I loved.
Elusive whisperings—or else the wind
That sighed and rustled stealthily about
The buildings—where it drifted in and out,
Had made those sounds. The old, old smell
Of castor, dope and oil still clung
To everything. Yet happily among
The rafters the same sparrows dwell.
A faded notice on the office door,
Illegible from age, writ long before
Still flapped. Gone the vain day when last it tried
To keep its writing clear. The tarmac too
Was cracked, all loose and grass-grown, with a few
Tall weeds and thistles peering here and there.
The glassless window frames and rafters bare,
Stared gaunt and empty on a clouded sky,
Which passed along, unchanged, the same way by.
But I, too full of sorrow, turned away
To hide my face. And so the looked-for day
Of which I'd hoped so much, now hated more,
Departed. I went sadly back alone
Along the Road I'd often trod before.

C. C.

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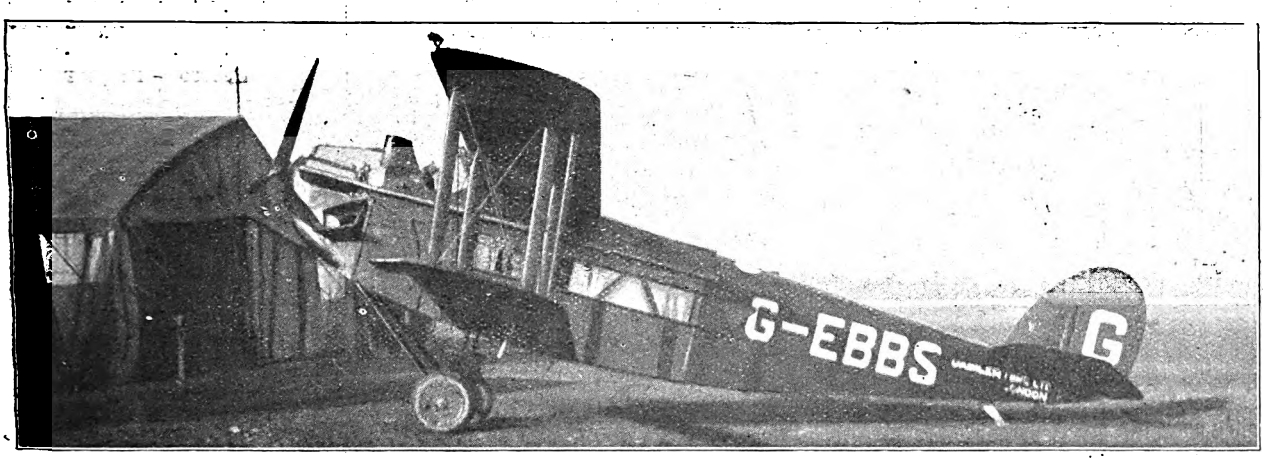
THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, FEB. 21, 1923.

Vol. XXIV. No. 8. SIXPENCE WEEKLY. [Registered at the G.P.O. as a Newspaper.]

"STILL GOING STRONG."



LIKE JOHNNIE WALKER:—This De Havilland 34 (Napier "Lion" Engine 450 h.p.) belonging to the Daimler Airway has flown 110,000 (one hundred and ten thousand) miles since she was put into service in the Spring of 1922 and is still flying. Despite the distance and despite all sorts of weather no part of the aeroplane has needed or does need renewing.

"K·L·G"

THE KING'S CUP, 1922,
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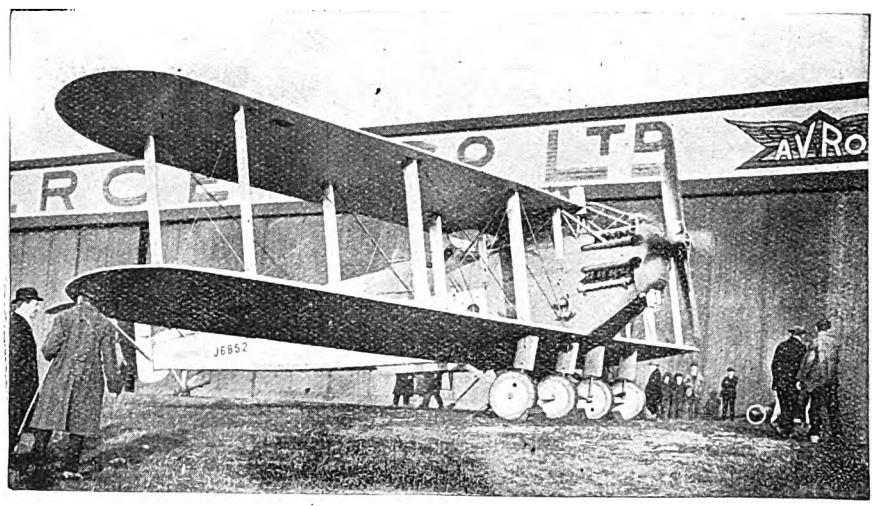

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This Bomber is a further development of the AVRO "Aldershot," which won the Air Force Handicap at the last R.A.F. Pageant. It is fitted with dual control, and the whole of it, with the exception of certain parts of the wings, is constructed of metal. The wings are designed to fold back so as to economise space when the machine has to be stored.

A. V. ROE & CO. LTD. invite inquiries for information concerning the building of machines for special purposes, or for the supply of AVRO standard aeroplanes or seaplanes.

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FEB. 21. 1923.

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ON THINGS IN GENERAL.

Toujours Les Conferences.

Thank Heaven this week sees the last of the Guildhall Conference which occupied the time of some hundreds of busy men for two full days and has since occupied columns of print which might have been put to better use. It reminds one of the small boy who on receiving his first thrashing asked his father whether he had been thrashed by grandfather. On being assured that grandfather had been thrashed by his father and he by his father and so on into the dim past of history the small boy asked "But who invented this thing anyway?"

The pity is that the people who invented conferences and congresses did not talk themselves and their hearers to death. Apart from the Guildhall, think of the time and money wasted over Lausanne when the Air Force at Constantinople could have settled the whole show by bombing Angora, and think of Genoa, San Remo, The Hague and Algeciras in our time, not to mention the Field of the Cloth of Gold, and the Councils of Nike and Trent and Worms and all the rest. It must have been a conference by Noah, Shem, Ham and Japhet which forced the animals out of a nice warm Ark into a cold wet World.

And now we are threatened with another Conference which is to waste everybody's time for the whole last week in June, just when the Independent Force Dinner on June 16th, and the R.A.F. Pageant on June 30th—besides probably the R.A.F. Gathering on June 29th, ought to be occupying all the space available for aeronautics in the non-technical press.

Here is the latest official announcement by the promoters of this orgy of talk:—

INTERNATIONAL AIR CONGRESS, LONDON, 1923.

A portion of the expenses in connection with the International Air Congress which is to take place in London from June 25th to 30th this summer will be covered by a special grant from the Air Ministry, and in addition to this there will be certain receipts from membership subscriptions etc. The Committee, have, however, felt it desirable to form a guarantee fund of not less than £2,000, which, together with the Air Ministry's grant, will it is anticipated provide security for the expenditure.

This fund was opened by the Duke of Sutherland (Chairman of the Main Committee) with a promise of £100, and the list of promises received to date is as follows:—Messrs. Shell-Mex Limited, £500; Messrs. The British Petroleum Co., £250; Messrs. Vickers Limited, £250; Messrs. Armstrong-Siddeley Motors Ltd., £100; Messrs. The Bristol Aeroplane Co., £100; Lord Cowdray, £100; Messrs. The Fairey Aviation Co., £100, Messrs The H. G. Hawker Engineering Co., £100; Mr. Holt Thomas, £100; Lord Inverforth, £100; Lord Invernairn, £100; Messrs. Rolls-Royce Company, £100; The Duke of Sutherland, £100; Lord Weir, £100; Messrs. Westland Aircraft Works, £100; Messrs. George Parnall Company, £75; Messrs. Aircraft Disposals Company, £50; Lord Burnham (Proprietors of the "Daily Telegraph"), £50; Messrs. The Effingham Steel Works and Rolling Mills Co. Ltd., £50; Sir John Ellerman, £50; Messrs. Thomas Firth and Sons Ltd., £50; Messrs. The Gloucestershire Aircraft Co., £50; Messrs. Handley Page Limited, £50; Lord Londonderry, £50; Sir Edward Manville, £50; Messrs. Palmer Tyre Limited, £50: Lord Waring, £50; Commander Burney, £26 5s.; Messrs. The Blackburn Aeroplane and Motor Co., £25; Sir James Dunn, £25; Mr. Philip Foster, £25; Major-General J. E. B. Seely, £25; Institute of Transport, £21; Messrs. Accles and Pollock, £20; Sir Mortimer Singer, £10; Mr. G. F. Luke, £3; Messrs. A. V. Roe, £100; Messrs. de Havilland, £50; Total, £3,155 5s.

First of all one may remark that it is rather a pity that people who are organising an affair in which words are the only product should not understand enough of their own language to know that anticipating a happening is quite different from expecting it. As one has on occasion told members of the staff of this paper, if they expect a rise in their salaries they can come to no particular harm whereas if they anticipate such a rise they will indubitably find themselves unable to pay their just or unjust debts until such time as the trade in aircraft improves.

Secondly, it is a pity if the organisers aforesaid do not know that a Limited Company is a singular entity, without soul to save or body to kick and therefore cannot properly be styled Messrs., whatever may be its business methods.

Thirdly, it is a pity that the said organisers did not take the trouble to indicate which of the distinguished subscribers to their guarantee fund happen to be Limited Companies and which do not.

You see as this affair is to be an International Air Congress compared with which that more famous affair at the Tower of Babel can only have been a kind of kindergarten class it would look so much better if we, as the organising country, took the trouble to be accurate in our own language.

Fourthly, it is a pity that this International Air Congress should ever be organised at all, for so far as one can discover none of the people who really matter in aviation, namely the R.A.F. and the Aircraft Industry, can see how any profit is to come from it to anybody except a few people who like to be in the limelight. So far as international relations are concerned one would lay any money that one of General Brancker's flying visits to the Civil Aviation Authorities of any foreign country would do more to establish friendly relations than all this Congress will ever do. And where purely commercial relations are concerned an exchange of visits between principals, as for example those between the chiefs of the Daimler Airway and the German Aero-Union, would do more in half an hour than a year of polyglot pow-wows could do.

So far as one can discover anything about the affair it seems to have been started originally by Sir Frederick Sykes, that arch-conferencier whose motto might well be *verba non res*. The arranging of the present show seems to be done from the offices of the Royal Aeronautical Society, which might very well devote its energies such as they may be to reviving the past glories of the R.Ae.S. instead of scheming this astonishing waste of time and money.

Reviving the R.Ae.S.

Certainly it is time that somebody took in hand the resuscitation of the Royal Aeronautical Society. When one attends the Society's meetings as they are to-day and compares them with the brilliant gatherings of a few years ago it is enough to make one weep for the departed glory of the World's oldest aeronautical association. Then we had full-dress debates with the Nation's most eminent men in the chair and with the highest officers of the Flying Services and the most important political people and the cleverest scientists among the audience. To-day we have a gathering of perhaps a few dozen bright-brained long-haired junior draughtsmen and such-like, and half a dozen aircraft constructors or designers who happen to be interested in the subject of the particular paper. And why? Simply through what an R.A.F. officer would call "bad staff work" on the part of the authorities of the R.Ae.S. in fixing "zero hour."

To begin with the Council of the R.Ae.S. decrees that its meetings shall begin at 17.30 hours—commonly called 5.30 p.m. Which means that to get to these meetings the ordinary man has to leave his office at 16.30. Which means messing-up his whole afternoon's work and leaving his letters unsigned till next day.

The result is that practically the only people who get to the meetings are a few young draughtsmen who are let off early by their chiefs to improve their education, and a few unemployed people, and a few Air Ministry officials who are directly concerned with the subject in hand (e.g., seaplane floats, metal construction, model tests or whatnot), and the chiefs of one or two firms directly concerned. The chief designers and draughtsmen and works-managers and improvers and commercial men and other Air Ministry officials cannot spend half an afternoon on a subject which is only of indirect interest to them.

Furthermore, even if one were prepared to upset the afternoon's work for these lectures one has to be willing to upset the whole evening as well, for they do not finish till 19.00

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or 19.30 hours and it is then too late to go home and change. Consequently if one has any kind of an important appointment for the evening one does not go to the R.Ae.S. meeting.

The remedy is so simple that one cannot understand why the R.Ae.S. Council does not see it without being told. Hold the meetings at 20.30, or better still take a hint from the next-door-neighbour of the Society of Arts, the "Little Theatre," and hold a "Nine o'Clock Revue" of aeronautical science. Then everybody can finish their day's work properly, go and have a decent dinner in peace or go home and change and dine, and turn up at the meeting feeling fed and refreshed and able to take an intelligent interest in things instead of sitting watching the clock and wondering whether these debaters will quit before people faint with hunger.

One believes that the present hour is fixed because somebody or other lives in some unholy place whither the last train goes at 22.00 hours or something of that sort. Surely to Goodness that particular individual or individuals can sacrifice his or their last train once a fortnight for the good of fundamental research, or else stop away from the meetings. Much better lose one or two regular attendants than the hundreds who stop away—and eventually drop their membership and subscriptions—under the present idiotic scheme.

Then the rest of us who have last trains at civilised hours can resolve to sacrifice a whole evening's bridge or bunny-hugging as the case may be to sit at the feet of our aeronautical Gamaliels and become wise once a fortnight. Most people go to a theatre or a show of some sort at least once a fortnight or so why not treat an R.Ae.S. meeting in the same spirit. It can be just as funny, albeit sometimes without intent.

If the meetings are held at a reasonable hour then papers will be read by men of standing like those who wasted their sweetness on the desert air of the Guildhall. Men of real importance will take the chair and be proud to do so, instead of as at present presiding out of pity for a moribund but respectable institution. Then people of note and intelligence will attend the meetings and it can be arranged that they will take part in the debates. And then the meetings will be reported adequately in the Press.

Thus public interest will receive a fillip at regular intervals instead of being gorged to indigestion as it was by the unintelligently reported accounts of the Guildhall Conference. And so the Society will not only save itself but will do much good to British Aviation. At present it is precious little use to anybody or anything.

Reforming the Air League.

It is time also that somebody took in hand the reform or revival of the Air League. One knows nothing of the internal mechanism of this institution beyond the fact that the Duke of Sutherland is its President and that the Secretary is reputed to be a very amiable gentleman. One's views on the Air League are entirely those of an impartial observer. Writing therefore as a mere man in the street one has to confess complete ignorance of any activity on the part of the Air League since the War, when so far as one can recollect it did excellent work in distributing vegetables to the Fleet, though one cannot remember that it did anything for the R.A.F.

Being somewhat on the inside of aviation one knows that the League exists, but one has no idea how. And as a member of the newspaper-reading public one has seen its name mentioned because, for some unexplained reason, it is represented on the Civil Aviation Advisory Committee (or whatever it is called) and sends representatives to Air Conferences and such things. But one has heard nothing of the Air League's doing any of the things that it might do to popularise aviation as the Navy League did in the days of the late Mr. Robert Yerburgh and Mr. Pat Hannen.

It is said that the Navy League is now trying to capture the Air League and form an amalgamation of the two. If that be true it shows cleverness on the part of the Navy League Executive. It is evident that as the Navy becomes less and less important and as public interest in aviation grows, as it is growing, it will be harder to get money for the Navy League and easier to get it for aviation. Therefore from the Navy's point of view it would be good policy for the Navy League to capture the Air League, collect money on the "air ticket" and devote the result to booming the Navy's claim to have its own air service.

That being so those who very wisely dread letting the Navy have another chance of making a hash of its air service ought to take immediate steps to save the Air League from falling into the hands of people with Naval sympathies. The public in general are very much alive to the need for Air Power and any well-run campaign in favour of our Air Force will meet with a ready response.

Evidently what the Air League needs is a born organiser to set out on a campaign all over the British Isles to enrol members for the League and make it a real live political force. The sort of man needed is a cross between St. Paul and Mr. Imre Kiralfy—all apostles of great causes have been largely showmen and all great showmen have been largely apostles and martyrs. Such a man can be found, and when found he ought to get big pay for big work. At any rate he ought to be paid by results without limit to his earnings.

Booming the Air League is no job for any man on a fixed wage. It should be done by a man who is at once enthusiastic and ambitious. When such a man is found and given a free hand the Air League may become a very great force indeed.

The Royal Aero Club's Scheme.

Meantime the Royal Aero Club, which with all its faults is far more a live force than all the other aeronautical bodies put together thanks to a few live men on the Committee and that eminent thruster Mr. Harold Perrin the Secretary, has just broached a new scheme which while not trespassing on the territory agreed with the Air League ought to do a great deal to increase interest in aviation. As a matter of fact if somebody takes hold of the Air League and shakes it into consciousness the R.Ae.C. scheme ought to be very useful to the League as a species of ground-bait. Here is the scheme as set forth in the official announcement :—

ROYAL AERO CLUB ASSOCIATESHIP.

The Royal Aero Club has been established over 21 years. Amongst its objects are :—1. To encourage flying for purposes of transport and national defence. 2. To stimulate interest in flying and to assist and encourage any person or institution engaged in advancing aeronautics. 3. To promote flying contests in various parts of the country and to offer prizes: (a) to encourage progress in design of aircraft and aero engines; (b) to advance the art of flying. 4. To assist the development of gliding by providing facilities at suitable localities and by offering prizes. 5. To secure uniform legislation relating to aeronautics. 6. To establish a Bureau of Information and Advice on Air Travel at home and abroad, customs regulations, passenger flights, etc.

It is of vital importance that the British Empire should be relatively as influential in the air as she has been in the past on the sea, both in the matter of commercial and fighting craft.

With the object of furthering these aims and of obtaining wider public support for its activities, the ROYAL AERO CLUB has instituted an ASSOCIATESHIP with an annual subscription of £1 1s. per person, open to all (men, women and children), and carrying with it a number of advantages and privileges.

PRIVILEGES :—1. Associateship of the Royal Aero Club. 2. Badge of Associateship. 3. Free admission to all aviation meetings organised by the Royal Aero Club, on presentation of Associateship badge 4. Passenger flights at half price with approved firms where the full fare does not exceed ten shillings per flight. 5. Representation on Council of Associates. 6. Access to the Bureau of Information.

FREE ASSOCIATESHIP :—(a) Persons introducing five Associates will have free Associateship for one year, entitling them to receive all benefits and privileges.

FREE TRIP BY AIR (OR RAIL) TO PARIS, BRUSSELS OR AMSTERDAM :—(b) Persons introducing 20 Associates will be entitled to a free trip by air (or rail) to Paris, Brussels or Amsterdam and return, provided advantage has not been taken of offer (a).

FREE TRIP BY AIR (OR RAIL) TO PARIS, BRUSSELS OR AMSTERDAM, AND AGREED HOTEL EXPENSES FOR ONE WEEK :—(c) Persons introducing 50 Associates will be entitled to a free trip by air (or rail) to Paris, Brussels or Amsterdam and hotel expenses for one week, provided advantage has not been taken of offers (a) and (b).

FREE TRAINING IN FLYING :—(d) persons introducing 200 Associates will be entitled to free training in flying for a Pilot's Certificate, Class A (this costs about £125), provided advantage has not been taken of offers (a), (b) or (c).

N.B.—In the event of the person introducing Associates as above not wishing to partake personally of any of the offers he or she may nominate some other person to receive them.

It is true that the R.Ae.C. scheme is of a propagandist nature, but it is propaganda for practical flying and not political propaganda, though in fact the more people actually fly the better it is from the political point of view. If everybody flew there would be no difficulty about getting money for the Air Force.

It is only because we are a sea-fed nation that it is so easy to get money for the Navy. And as soon as the bulk of our people realise, as a rapidly increasing number do already, that we are henceforth far more dependent on Air Power than ever we have been on Sea Power we shall get all the money we want for the Air Force. Therefore one hopes that all readers of this paper will do their utmost to help the Aero Club scheme and will use their greatest persuasiveness to induce their friends to do likewise.—C. G. G.

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ON A FAMOUS VICTORY.

R.A.F. people who did not or could not go to Twickenham on Wednesday missed the treat of a lifetime. Apart from the pure intellectual joy of seeing the Navy's attacks smashed by the sheer fierceness of the R.A.F.'s counter-attack, as we all hope to see the Navy's political attacks smashed in Parliament shortly, the game was the best show of real Rugger that one has seen for something over 25 years. It reminded one of the great days of Irish Rugger when Ireland won the Calcutta Cup and when Forrest scored a winning try, as Jakes McCarthy described it "crossing the line festooned with Saxon forwards."

Looking back on Wednesday's game one has a mental vision of man after man of the R.A.F. team horizontal in the air about three feet from the ground as if flying a speed test over the measured kilometre without wings or engine. Never has one seen such tackling. The R.A.F. seem to have absorbed the good old Rugger doctrine, "Damn the ball, go for the man." Whenever a flat-foot laid a hand on the ball at least one R.A.F. man launched himself head-first for the sailor's midrif and it was seldom that the victim escaped coming down with a dull thud.

The R.A.F. tactics evidently were to smother the Navy's backs, and the result was a magnificent exposition of the theory of the offensive-defensive according to Clausewitz. On the face of it, with the Navy playing six internationals and an English reserve, it scarcely seemed likely that the R.A.F. could do more than avoid defeat, so for the first quarter of the game it appeared as if the R.A.F. had adopted the limited objective of attacking the Navy's *stoss-truppen* rather than the actual goal-line. So fierce was the attack on the Navy's halves and three-quarters that one doubted whether the R.A.F. forwards could stick the pace. Every man was tackling like a three-quarter and the R.A.F. three-quarters and halves tackled as if each of them were two men. Bryson and Riddle in particular over and over again bagged a right and left, tackling and slinging the Navy man who first got the ball and then as he passed tackling and throwing the man who took the pass.

We have been told by professional Rugger critics that the famous Commander Davies R.N. took to punting up the touch-line because the ball was so greasy that his backs could not hold it and passing was impossible. As one who watched every movement in the game with nerves on edge one can say that such a statement is pure bunkum and a very poor excuse for the Navy's licking. The fact is that whenever a Navy back did get the ball he was promptly smothered before he could get going. It was only when a back dropped the ball that he escaped being rubbed in the mud, and not always even then.

The pace of the game was ferocious. It would have been fast on a dry ground, so what it must have felt like in that mud almost gave one heart-failure to contemplate. The R.A.F. people must have been trained to a hair, for they kept their attack going to the bitter end and showed far less signs of distress than did the beefier Navy forwards.

Young Mr. Wakefield is certainly a fine leader of a pack, even if he be a trifle touchy to constructive criticism, and one hopes that having in this match proved himself to be the organiser of victory he will take kindly the suggestion that he should kick into his forwards the idea that they *must use their feet.* Over and over again the R.A.F. could have got into the Navy's 25 and several times over the Navy's line if they had kept the ball in the loose and dribbled. Nothing could exceed the pluck of the R.A.F., forwards and backs alike, in going down on the ball in front of those big Navy forwards but they did not use their own feet as they ought. Whether it is that they are so used to going down that they do it instinctively whether the ball is going with them or against them, or whether they are so used to stopping foot-rushes that they have no faith in them as a tactical method one cannot say. But the fact remains that the R.A.F. team misses many chances by not using its feet. And if the Army team next month happens to have a pack which plays the good old Scottish and Irish forward game the R.A.F. will learn something to its disadvantage.

Whether the R.A.F. threes can run as well as they tackle remains to be seen. They had no chance of running on Wednesday, for they were bang up on top of the pack smothering the Navy's attack all the time. And anyhow nobody could have run on that ground. If the Air Ministry did things on Admiralty lines the R.A.F. three-quarters and halves would be posted to Flowerdown or Netheravon where on Saturdays, Sundays and half-holidays between now and the Army match they would be practised for several hours a day in running and passing against a scratch team of 20 or so of the rest of the station. Magnificent as is their tackling one is the least little bit doubtful about their ability to form a scoring combination on a hard dry ground. One apologises in advance to the individuals and to their skipper for having such a doubt and for making such a suggestion.

Still, whether the R.A.F. beats the Army or not, the great fact remains that the R.A.F. has beaten the Navy at the only game that matters. One doubts whether the R.A.F. itself realised the magnificence of the victory. Certainly the event was not celebrated adequately for neither Vine Street nor Marlborough Street were aware of the fact that night or next morning. Possibly the shock of the surprise was so great as to prevent proper celebration till it was too late. Or perhaps the occasion was thought to be one for silent thanksgiving rather than for public proclamation. But if by any chance the R.A.F. does happen to beat the Army, most distinctly something ought to be done about it.

However, be that as it may, the Navy have been thoroughly beaten by the hitherto despised R.A.F. And, as Old Caspar remarked, "It was a famous victory."—C. G. G.

[The match is described technically on p. 142.—Ed.]

THE INSTITUTION OF STRUCTURAL ENGINEERS.

The Annual Dinner of the Institution of Structural Engineers was held at the Savoy Hotel on Wednesday, February 7th, and was attended by upwards of 250 members and guests. Replying to the toast of "His Majesty's Services" proposed by Sir Charles T. Ruthen, member of council of

THE VICTORIOUS TEAM.—From left to right, back row: F/Lt. Riddle, AC. Collins, P/O. Coventry, F/Lt. Bryson, F/O. Adams, F/O. Chick, F/Sjt. Smith; front row: L/AC. Runham, L/AC. Snaith, S/Ldr. Russell, F/Lt. Wakefield (Captain), F/Lt. Usher, F/Lt. Simpson, F/Lt. White. Inset: Top right-hand corner, F/Lt. Lowe, who arrived too late to be included in the group, and, bottom right hand, F/Lt. Simpson, who scored the only try of the match and in the group was apparently bowed down in prospect at the weight of his responsibility.

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the Institution, Maj.Gen. Sir Sefton Brancker, K.C.B., A.F.C., said that he felt a peculiar aptitude to speak on behalf of the Services: he was a bad sailor, many people had regarded him as an indifferent soldier, he had crashed various machines for the Royal Flying Corps, and he was now by way of being a Civil Servant: of his latter position he could only say that at any rate he tried to be civil

He said that our standing Forces, the Navy, Army and Air Force must be as small as we could make them, but extremely good. He himself had hoped that the War would be followed by National Service. The Government of the day had at once opposed National Service, but at the same time had promised to hang the Kaiser, make Germany pay, find homes for heroes, and do other things which he would not specify. As they had not hanged the Kaiser, Germany had not paid, and heroes were still homeless, he hoped that we might yet have National Service. At any rate it would do a great deal to solve the unemployment problem.

The Engineering profession would play a very large part in the future of the Royal Air Force and of civil aviation. These professions would have to work together. The expansion of civil aviation, which would very certainly come within the next few years, would create an enormous amount of work for structural engineers, and perhaps the structural engineers might first help civil aviation by designing some more central aerodromes. He had been told of various schemes for aerodromes in the centre of London which ranged from one covering Hyde Park, with Winter Gardens underneath, to a more feasible scheme for building over one of the great railway termini, near the river. He had personally gone to the trouble of getting an estimate of cost from the Government and the lowest estimate for such a scheme was £4,000,000, the interest on which was about £200,000 per annum. At the present time perhaps 2,000 machines might be expected to land on such an aerodrome during a year, which would mean that to make the proposition pay the landing fee would have to be about £200! However, the estimate was a Government one, and perhaps a real engineer would find it might work out at less! In any case the engineer would take care to draw his fees for the work!

The Press had taken up a statement made by him that in a few years' time we should fly to America in 12 hours. A certain amount of ridicule had been poured on the statement, but he had made it in all seriousness. They had devices at which they had been working for 10 years and were near perfection. These were going to give a form of forced draft to aero engines which meant that when they reached high altitudes their power would be maintained, and they would obtain the advantage of the rarification of the atmosphere. He had stated that the speed attained would be 300 miles per hour, and this was not a wild statement.

Other speakers were Lord Riddell and Mr. Justice Darling, and the Rev. F. H. Gillingham. The last-named replying for the "Guests," said that he had been asked to reply on behalf of the Church and Sport. He had no hesitation in assuming that those present would prefer him to confine most of his remarks to sport. He had been very interested in listening to General Brancker, because he had had it forcibly impressed upon him that at any rate the Royal Air Force personnel were sportsmen He had very much enjoyed himself the previous year at the R.A.F. Club cricket week.

He told many stories, one of which concerned the R.A.F. A parson from Bermondsey serving with the Palestine Force near Jerusalem got some leave and went out thirsting for knowledge. He met an airman from Bermondsey, also thirsting, and inquired of him the direction of the Mount of Olives. "I dunno," replied the Bermondsey aviator, "but the Bunch of Grapes is round the corner."

Luck probably played a very great part in flying, and he could not help feeling that aviators must be born lucky—at any rate there were a number of them still alive. What was luck? He could only think of one example, and that concerned two gentlemen of Semitic origin who were in Selfridge's one day when the lights fused for about three minutes and the place was for that time in darkness. They met outside afterwards, and said Moses (with his pockets bulging suspiciously): "Any luck, Isaac?" "No," groaned Isaac, "I was in the piano department." This showed he thought that luck was a combination of circumstances and opportunity, of which he found that airmen were very quick to take advantage.

NOT IN THE PERIOD.

In The Aeroplane of January 3rd there appeared a sad but true story of how the Naval Commander-in-Chief of the Mediterranean received an involuntary bath as the result of a mishap to a flying boat. Certain of one's friends in Malta appear to be grieved by the telling of this story, as it might appear that it happened among the events of 1922. As a matter of fact it occurred early in 1921 before the R.A.F. in the Mediterranean had been re-organised and re-equipped as it has been since.

The story was merely told as an example of how accidents will happen in the best regulated Services, but one freely admits that it should have been made clear that it was not an incident of 1922. The extraordinarily fine flights made by various officers of the R.A.F. in the Mediterranean during 1922, including as they do flights between Malta and Gibraltar and Malta and Constantinople, both on flying boats and seaplanes show what a marked improvement there has been in the equipment of the R.A.F. and the maintenance of its material during the past year.

A NEW HEIGHT RECORD.

On Sunday, Feb. 11th, M. Casale, flying a Spad Herbemont 56 biplane fitted with a Bristol "Jupiter" radial air-cooled engine, reached a height of 7,200 m. with a useful load of 250 kgs.

This flight beats the previous record of 6,783 m. made by M. Le Boucher on a Breguet biplane equipped with a 250-h.p. Renault engine and Rateau supercharger.

The Spad 56 is similar to the Spad Berline used on various French air-lines except that its cabin is considerably larger and more comfortable and the wings are of steel construction.

The climb to 7,200 m. took 50 minutes and the descent 11 minutes.

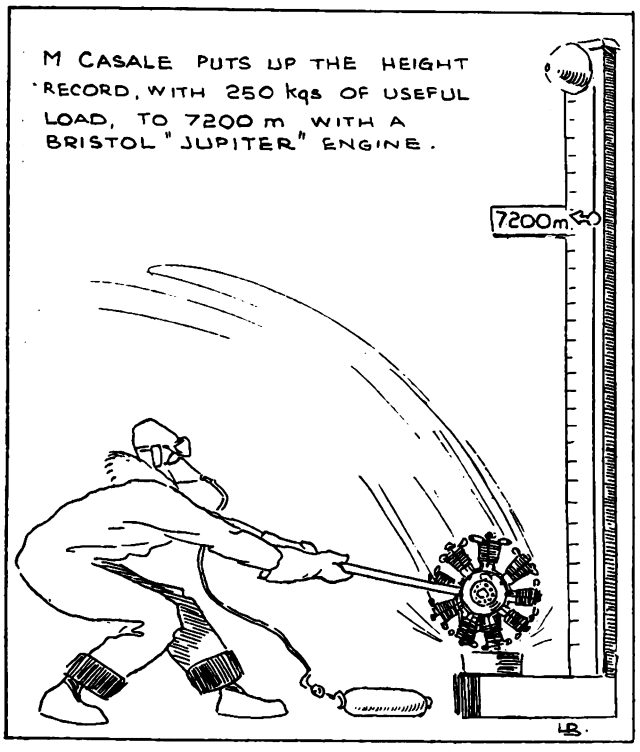
The weight of the machine on taking off was 1,725 kgs., which with a wing area of 45.5 sq.m. gives a wing loading of 38 kgs. and a power loading of 4.7 kgs.

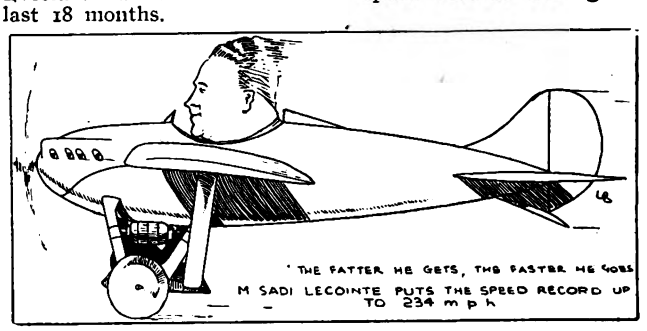
A NEW SPEED RECORD.

On Feb. 15th at Istres, near Marseilles, M. Sadi Lecointe flew at an average speed of 377.657 km. (234⅜ miles) per hour, thus beating the standing record of 361.280 km. (224⅝ miles) per hour set up by Brig.-Gen. Wm. Mitchell of the U.S. Air Service at Selfridge Field on Oct. 18th, 1922.

The speeds over the four kilometres were as follows:—391.304 km.p.h., 360 km.p.h., 382.978 km.p.h. and 376.348 km.p.h. and his landing speed was 180 km., or nearly 112 miles, per hour.

He was flying the Nieuport-Delage "Sesquiplan" fitted with a boosted 320-h.p. Hispano-Suiza engine giving 400 h.p. at 2,000 r.p.m. It is the identical machine on which M. Kirch won the 1921 Coupe Deutsch and on which M. Sadi Lecointe has made innumerable speed records during the last 18 months.





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THE AIR CONFERENCE.—III.

The Establishment of a Self-Supporting Airship Service.

By COMMANDER C. DENNIS BURNEY, C.M.G., M.P.

The benefits that would accrue from the successful establishment of an Imperial Airship Service may be divided into three groups :—

(1.) The political advantages accruing from a safe and cheap form of transport that provided for the British Empire the equivalent of the through trunk railways of America : (2) the value in war-time of a fleet of airships with fuelling bases all over the world, and (3) the value of a commercial company with British capital operating a service on a profit-making basis.

PROSPECTS OF COMMERCIAL SUCCESS.

Unless there is a reasonable prospect of earning profits, there is a definite bar to that great expansion which is essential for the realisation of the first two groups.

As long ago as 1910, a German airship company called "Delag," started a passenger service and 26,900 passengers made journeys. After the Armistice this same company, with the "Bodensee," ran a service between Berlin, Munich and Friedrichshaven. In three months this vessel made 103 flights, covered 50,000 kms. and carried 2,380 passengers and about 30 tons of freight. These statistics seem to indicate the suitability of an airship for passenger work. There is no record of a fatal accident to any passenger carried by a commercial airship.

There were, however, several defects which have prevented the airship developing rapidly as a passenger vehicle. These were :—

(a) There was no method of mooring for embarking or disembarking passengers and freight.

(b) The carrying capacity was too small in relation to the capital cost of the vessel.

(c) The radius of action was too small for the great ocean routes.

Developments both during and since the war have, in a large measure, overcome these defects, but no vessel has yet been built which embodies these developments.

The airship shed can now be considered as a dry-dock and need only be used every few months for large repairs or a general overhaul.

In considering the high capital cost of the vessel on the basis of its carrying capacity—the most important factor is the figure that can be given to the percentage of disposable lift. Such lift can be improved by improved design and by increase of size in the vessel.

The improvement possible is very strikingly shown by comparing L.1, L.33 and L.71 :—

Vessel.	Built.	Percentage Disposable Lift.	Speed. m.p.h.
L.1	1912	31.6 per cent.	48
L.33	1916	47.0 per cent.	64
L.71	1918	67.5 per cent.	73

The question of sufficient endurance for the great ocean routes is largely governed by the disposable lift factor. Another factor of almost equal importance is that of engine efficiency and fuel consumption. Great advance has recently been made. Experiments have established that kerosene and hydrogen can be used together as an airship fuel, and the radius of action increased by 33 per cent. Owing largely to the very high thermal efficiency obtainable with this fuel, the exhaust temperatures are so reduced that the life of an engine should be increased by 400 per cent. [It would be of interest if Comdr. Burney would explain why.] The thermal efficiency is remarkable. Some tests have given a figure as high as 38.7 per cent. The fuel is under half the cost of petrol and the amount required is one-third less.

The best way to show that these improvements render a vessel efficient for the great ocean routes is to give the capabilities of the 5,000,000 cubic ft. vessels which it is proposed to build. These would be approximately 760 ft. long and 110 ft. dia. Allowing a disposable lift of only 50 per cent., to make provision for the strength desirable for commercial work, assuming a flight of 3,000 miles as the average flight without refuelling, there would be 44.5 tons available for mails, passengers, etc., at a speed of 80 m.p.h. Over 200 passengers and 10 tons of mail could be carried.

Estimates have been worked out for a fleet of airships of this type operating on the Indian and Australian routes.

These estimates suggest that a total capital of £4,000,000 would be needed, that £1,830,000 would have to be expended to inaugurate a bi-weekly service to India as a first stage, and that the running costs of such a service for one year would amount to £880,750.

The estimated receipts show a margin of about £1,000,000.

FIRST STAGE—BI-WEEKLY TO INDIA.

Capital Expenditure on Indian Route only.

	£
6 ships (£175,000)	1,050,000
1 shed, Egypt (£150,000)	150,000
6 mooring masts (£15,000)	90,000
2 gas plants (£80,000)	160,000
Alterations and additions at Cardington	30,000
London Offices	20,000
1 new double shed, Cardington	250,000
2 mooring masts, Pulham	30,000
Enlarging existing sheds, Pulham	50,000
	£1,830,000

Running Expenses.

	£
6 crews (£12,000)	72,000
Fuel	115,000
Hydrogen	100,000
Bases, offices, etc.	170,000
Material for repairs per ship (£10,000) excluding labour charges which are included in base charges	60,000
Booking Agents' fees, advertisements, etc. ...	25,000
Insurance Fund (7½%)	78,750
	£620,750
Add Standing Charges—	
Depreciation (Ships) 20%	210,000
Depreciation (Bases)	50,000
	£880,750

Receipts.

Bi-weekly service to India (included in which are mails, parcels, and passengers for Australia).

Weekly.—2 out and 2 in.

Capacity 44 tons—mail, parcel and baggage—divided as to 16 tons mail, and 28 tons parcel and baggage. 400 first-class and 400 second-class passengers.

Assume : 50% load passengers and 70% load parcels and baggage at rate of 1s. per lb. and full capacity first-class mail, but excluding French, Dutch, and German mails and also all Chinese and Japanese traffic.

Receipts on Indian Route—First Stage.

	£
20 tons of mail matter at 4s. 3d. per lb., equivalent to surcharge of 3¼d. per oz.	515,000
70% of 28 tons—20 tons at 1s. per lb.	116,480
50% of 400 first-class passengers per week at fare of £70 (£14,000 per week)	728,000
50% of 400 second-class passengers per week at fare of £45 (£9,000 per week)	468,000

	£
Passenger receipts	1,196,000
Mail (First class)	515,000
Parcels and baggage	116,480
Total Receipts ...	£1,827,480

THE FINANCIAL PROBLEM.

With most new developments it is possible to try them on a small scale. With the commercial airship operating over great distances this is not possible, bases have to be provided, the ships themselves are large and costly vehicles. No development service of much value could be started under £4,000,000 of capital. To raise such an amount on what must be a speculative enterprise some great inducement must be given. No responsible person would take the doubtful step of raising money for an Imperial Service on the promise of large dividends as there is not sufficient experience on which to obtain accurate figures.

If the inducement of a large return is impossible, it is necessary to devise some other method. If security of capital and assurance of dividends over a definite term of years can be given, the money can be raised on the cheapest terms. Under these circumstances some other than the shareholder must take the risk.

To meet this case a scheme was submitted to the Admiralty last August and it is now under consideration.

In outline this scheme was that a company should be formed to take over all existing airships and their bases and to build a fleet of the latest type of vessels. The company would construct fuelling depots and mooring bases at Port

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Said, Bombay, Rangoon, Singapore, and Perth (Australia), and institute a bi-weekly mail and passenger service to India with a weekly extension to Australia. The whole of the organisation would be at the disposal of the Admiralty in time of war.

The Government, in consideration of the benefits outlined, were asked to guarantee the debentures as to principal and interest and the ordinary shares as to dividends only for 10 years at the rate of 6 per cent. The Admiralty would take the risk and obtain for a possible liability all the benefits that they could obtain by providing all the money required.

I would rather lay the claim to Government assistance on the Imperial aspect, but I am prevented from so doing by Mr. Lloyd George's statement in the House of Commons in July last, that "No money is to be expended by way of subsidy on a Commercial Airship Service or upon Imperial communications," and that he had appointed a Committee to investigate the uses of airships in war-time. It is clear, from the point of view of practical politics, that the only way of obtaining the necessary Government backing is to make out the case for the uses of airships in naval warfare.

For naval reconnaissance with an airship the whole carrying capacity can be put into extra fuel and wireless equipment. The result would be to increase the range of flight to 12,000 miles at 80 m.p.h. or to 24,000 miles at 40 m.p.h., nearly three weeks without alighting.

The aeroplane can attack with a good prospect of success by virtue of its very high speed and three-dimensional movement. It suffers from a defect so grave that it cannot replace any form of fighting ship. That defect is its limited radius of action. The airship remedies this by giving to the aeroplane a speed and range of action in excess of any floating vessel. The airship on the other hand presents a target larger than a battleship and is, therefore, an unsuitable vessel to attack by itself. The aeroplane removes this defect by increasing the range of the airship by the radius of action of the aeroplane it carries.

The last war showed that any vessel was jeopardised if hit by a torpedo and the type of carrier can have no bearing on the result—whether aeroplane, submarine, or destroyer. The two new battleships now being built are to be protected from torpedoes by extra bulkheads, saddle-tanks, internal armour and other improvements of a technical character, and it is suggested that they will withstand the attack of four or five torpedoes. But does any reasonable man doubt that the answer will be to make torpedoes of five times the destructive power? The battleship will then be where it is to-day—one torpedo correctly placed will incapacitate her. History has shown that the prophets who foretold the elimination of the battleship by the torpedo-boat and the submarine were wholly incorrect. To-day an agitation is taking place to concentrate entirely upon aircraft and this is opposed by a section which claims that so long as our floating trade is carried in floating vessels, so long must floating warships defend that trade.

Surely, neither of these two schools of thought can be wholly correct as the British Navy exists to perform two main functions, to secure the sea for the transport of British merchandise, troops, etc, and to deny the sea to ships of the enemy. The method by which it attains its objects is either to fight or contain the enemy warships, but it does not exist for that purpose.

If the political object can be obtained without the intervention of a floating navy, then there is no reason for a floating navy. It is a fallacy to argue that if we transport merchandise on the water it follows that the military appliances to enforce that result must also travel on the water.

Statistics show that the modern Zeppelin has flown comfortably in an 80-m.p.h. gale, and it follows that the modern airship—once it is in the air—has as good air-keeping qualities as the battleship has sea-keeping qualities. As regards cost, if a battleship cost as little as £4,000,000 and an airship as much as £250,000, 16 airships can be produced as cheaply as one battleship.

Sixteen airships would carry 32 torpedo-carrying planes and 48 fighting planes. It will be conceded that if such a force were to attack one battleship, it is probable that the battleship would succumb.

In considering reconnaissance duties we have the fact that during the war one of the R. class airships maintained wireless touch with the Azores from the North Sea. How does such a vessel compare for these duties with a light cruiser? An airship for reconnaissance duties only can have a range of action of 20,000 miles. It would be necessary to carry a couple of fighters for defence. A rough estimate of the comparative cost of an airship and a light cruiser in searching 1,000 square miles of sea shows that the cost by airship is £1 5s. per square mile and by light cruiser £77. As regards capital cost the same work would be done by a fleet of nine airships as by a fleet of 60 cruisers. The saving in capital cost being £51,750,000.

LESSONS FROM THE HISTORY OF THE NAVY.

If it be accepted that airships are necessary from a naval point of view, it is desirable to find out how best that development may be guided.

The British Navy has developed slowly. In the early days there was little or no difference between a trading ship and a warship, and the average vessel could be used for either purpose. Accordingly the King's Navy scarcely existed, only a few vessels were retained as a nucleus, and in times of stress merchant ships were either hired or impressed.

As science developed the divergence between the fighting ship and the trading ship became more marked with the result that the Royal Navy at the outbreak of the war in 1914 consisted of special craft of many types and not one of these classes of vessels had any similarity to a merchant vessel. Nevertheless, the Navy had to call upon the Mercantile Marine not only for transport of its own supplies and of the Army, but also for fighting purposes. At the end of the war there were some 3,500 auxiliary vessels converted from fishing and trading purposes.

In regard to personnel, there were enrolled in the Royal Navy three men drawn from Volunteers or the Mercantile Marine to every man that the Navy proper employed at the outbreak of war. Without this great Marine Reserve to draw upon, it is more than doubtful if British arms would have been successful either at the time of the Armada or during the Great War.

The lesson to be drawn from our experience is clear. Seapower must be built upon the broad base of a great Mercantile Marine which in war time co-operates with a powerful and efficient Navy of specialised fighting vessels.

If this be true and if it is probable that air-power will gradually replace sea-power, there will be the intermediate stage when the mastery of the seas depends upon securing the aerial advantage. During this stage the relative efficiency of the floating aircraft-carrier and the airship-aeroplane is a very pertinent consideration. It seems logical that the cheaper, faster, and larger radius of action-carrier must, in the end, be adopted. And there is the fact that the armed surface vessel and submarines which can attack the floating aircraft-carrier are harmless against the flying-carrier. And this latest vessel can attack the battleship without having to fight its way through the protecting screen of floating vessels.

The battleship to-day is the prop on which cruisers, destroyers, minesweepers, armed merchantmen, etc., depend

Obviously the patrol vessels are not concerned as to the actual form of prop so long as they can depend upon it.

If the argument is followed to its logical conclusion, science may alter not only the form and construction of the prop, but its very characteristics.

It is not suggested that battleships can be given up to-day, but the lesson to be drawn is that airships will have a growing influence on naval strategy and tactics and the final consideration is how can the British Empire lead in airship development.

The lesson of history is that a fighting Navy must be based upon a Mercantile Marine and in the early stages there was little difference between the fighter and the trader. It is logical that the development of the air should follow the same lines. To start with the airship will be merely a reconnaissance or auxiliary vessel, but as it develops so will the requirements of war and trade necessitate a divergence of type. They will always have the same fundamental requirements of bases, constructional facilities, trained crews, etc.

If this reasoning is sound, airships should be developed upon a commercial basis, and when a divergence of type between the reconnaissance or auxiliary vessel and the trading vessel becomes necessary, then is the moment for the commencement of a Navy of specialised fighting airships

The Technical Discussion.

SIR WM. JOYNSON HICKS in taking the Chair for the second part of the day on February 7th gave a short discourse on the technics of aeronautics. He made the bold assertion that tests in the laboratory gave completely accurate forecasts. [In this connection one would like to direct Sir William's attention to the frantic efforts which are being made to reconcile model tests with full-scale experiments all of which tests at present go to show the hopeless inaccuracy of model tests.]

He said that we could not afford a big Air Service and that therefore we must not economise in research. He made the somewhat astonishing assertion that metal construction would prevent fire in the air. [One has always been under the impression that what caught fire and burnt in the air was petrol and not fabric or wood. Personally one sees very little choice between being burnt at the stake and roasted in an oven, which seem to represent the two alternatives in the case of the petrol in either a wooden or a metal aeroplane catching fire.]

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Designers and Manufacturers of the Fairey Type III. Series of Machines as supplied in quantity to the British Government during the War and since its termination. In this series of Machines the Fuselage, Centre Plane, Tail Unit, etc., are standard and are adapted to take different types of wings, chassis and engines of other Machines of the series to suit the particular purpose for which the machine is required. All machines of this type have folding wings and are fitted with our patent Variable Camber Gear giving high performance and lifting power combined with low landing speed.

Fournisseurs des Ministères de la Guerre, de la Marina et de l'Air.

Seuls détenteurs du brevet Fairey pour dispositif de cambrure variable pour aéroplanes, hydravions et bateaux volants.

Constructeurs de toutes espèces d'hydravions, bateaux volants, aéroplanes, appareils amphibies avions spécialement aménagés pour levées topographiques et photographiques, hangars flottants et équipement complet pour ces derniers.

Constructeurs, sur commande spéciale du Gouvernement Britannique du plus grand bateau volant construit jusqu'à ce jour.

Etude et entreprise de la fourniture du matériel complet pour services de transport aérien rapide de passagers, postes et marchandises. Constructeurs des Fairey Type III. Série de machines journies en grandes quantités au Gouvernement Britannique pendant la guerre et depuis la cessation des hostilitiés. Dans cette série de machines, le fuselage, le plan central et la queue, etc., sont de type normal, et sont construits de manière à pouvoir recevoir des ailes de types differents, ainsi que des châssis et moteurs d'autres machines de la série, de manière à être appropriés à l'usage auquel la machine est destinée dans chaque cas particuleur. Toutes les machines de cette série ont des ailes démontables et repliables et sont munies de notre dispositif breveté de cambrure variable, qui permet les plus grandes performances et qui combine une grande puissance de soulèvement avec une faible vitesse d'atterrissage.

Proveedores del Almirantazgo, Departamento de Guerra y Ministerio de Aviación Bri anicos.

Unicos poseedores de la patente Fairey de dispositivos de combeo variable para aeroplanos, hidroaviones y barcos aéreos.

Diseñadores y constructores de hidroaviones, barcos, aéreos, aeroplanos, aparatos anfibios, de todas clases, tambien de aparatos especialmente adecuados para el levantamiento de cartas topográficas y fotográfias, hangares flotantes y completo equipo para estos mismos.

Diseñadores, por orden especial del Gobierno Británico del barco aéreo más grande que se ha construido para este gobierno.

Proveedores de todo lo necesario para servicios de transporte aéreo de pasajeros, correos y mercancías.

Diseñadores y constructores del tipo Fairey III. Serie de aparatos suministrados en grandes cantidades al Gobierno Británico, durante la guerra y *después de su terminación.* En esta serie de paratos, el fuselage, el plano central y la unidad de la cola, son de tipo normal y fabricados para adaptarse á diferentes tipos de alas, chassis y motores de otros aparatos de series que sean adecuadas para los fines particulares a que se destina el aparato en cada caso. Todas les máquinas de este tipo, tienen alas plegadizas y están provistas del dispositivo patentado de combeo variable Fairey que da una alta capacidad y potencia de ascensión combinada con una velocidad baja de aterrizaje.

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Furthermore Sir William prophesied that we should in due course have aeroplanes flying at 300 miles per hour at a height of 30,000 feet, that we should have wireless which would listen to conversations in private rooms without microphones and that we should have aeroplanes without pilots. [The one consolation about these prophecies is that all of us at any rate will be dead before these things happen.] The Chairman ended by exhorting his audience to keep England in the van—[which at any rate would be a pleasant alternative to being in the cart, which seems to be the present position.]

PROFESSOR LEONARD BAIRSTOW, Chairman of the Royal Aeronautical Society, said that although, as Sir Geoffrey Salmond had said, research had no horizon it had milestones and landmarks and that the particular landmark at the moment was reliability and safety. Much of the progress recently made was due to Sir Geoffrey Salmond

The learned professor said that the weakest feature of aviation at present was in regard to safety and reliability. Research, particularly at full-scale, was essential on this point and he was glad to say that they now had aeroplanes designed specially for research work on the full-scale. It was a great advance to have available a machine whose whole surplus load capacity could be devoted to carrying the necessary experimental appliances. As regards model research we were now very excellently equipped—work of this type cost relatively little and was of great value.

The present position was that for at least most cases model results gave a good first approximation to full-scale results and more complete and accurate full-scale testing was essential to further progress.

The investigation of accidents led one to realise how serious might be the consequence of the most trivial error in aeronautics. Take the case of a choked carburretter jet. On a car it meant at most a momentary delay—on an aeroplane a forced landing, possibly an accident. To improve the jet or to secure fuel free of dirt was a way to avoid the difficulty—but one was led to more fundamental considerations—such as the attempt to find a fuel with which the engine was less susceptible to mixture variations, and further still, to discover means of making aeroplanes so controllable that the danger of forced landings was reduced. Sir Geoffrey Salmond had recorded the feat of gliding at above the stall angle—as a result there was the hope that control at all speeds would be secured—and then a machine could always be landed at least on the undercarriage which was meant to take the shock.

There was one matter to which he had to refer sorrowfully. This was the posting of an officer of the R.A.F. who had carried out valuable research work to another place. Research would suffer. He understood that this officer would sacrifice his future career in the Air Force if he remained at research work and it was in fact difficult for an officer of the R.A.F. to look forward to any continued career in that service if he devoted himself to technical work. In other Government Departments provision was made for technical officers and he hoped that something might be done in the R.A.F. to provide for their future.

COMMANDER BIRD (Supermarine Aviation Works) congratulated Mr. Fairey on his paper. It was agreed that there was no more controversial a subject than that of float *v.* flying boat, and the lack of proper comparative tests was a very important matter. The Air Ministry had done their best with limited funds, but much more was necessary in this direction. The seaplane had not had a fair chance as yet—and very particularly seaplane designers needed to be given the result of tests much more quickly than at present.

He suggested that the Air Ministry should send various types of seaplanes to the Gothenburg Exhibition this year.

He could not altogether agree with Mr. Fairey as to the disadvantages of the flying-boat type. The difficulty of the high centre of thrust could and had been overcome and it was possible to arrange a flying-boat so that the airscrew thrust made no difference either to trim or stability. Neither did he agree that the risk of loss from damage to hull in the flying-boat was greater than in the float machine. The modern hull with double bottoms formed by the steps and with watertight compartments was not likely to sink, a seaplane with a punctured float turned turtle.

As to the merits of the single and the two-step type of hull, it was possible to make a hull stable on the water but yet controllable.

The present methods of handling seaplanes were bad, but those suggested by Mr. Fairey were too costly. Large seaplanes must remain afloat normally, going into dock or onto a hard for hull inspection or repairs—just as a motor-boat. These practical questions of handling and operation were of first importance.

Another point was that of engines. At present seaplanes were fitted with precisely the same engines as used for aeroplanes. Special attention should be given to the design of seaplane engines to protect them from the effects of spray, etc.

SIR RICHARD GLAZEBROOK made his usual plea for the continuance and reinforcement of research—particularly free and unrestricted fundamental research. He gave the very illuminating parallel of electrical engineering—which is practically an exact science. It owed its present development to the fundamental research of such men as Faraday, Clerk Maxwell, Kelvin and Rayleigh, who had no sort of eye to the immediate utility of their work. The equivalent of the work of these electrical pioneers was yet to be done for aeronautics. By a curious coincidence he had just received notice of two papers to be read at the next meeting of the Royal Society—one by Prof. Bairstow on the flow of a viscous fluid around a cylinder and one by Prof. G. I. Taylor on the flow of a viscous fluid round an ellipsoid. If these papers justified the preliminary announcement they were the beginning of a real exact knowledge of aeronautics and they might well prove to be of more ultimate value than all other aeronautical research put together.

Commander Burney had proposed the inauguration of a service of airships larger than any previously built. He wanted to know if the promoters of this scheme were really satisfied that all the technical difficulties were soluble. Personally he was convinced that we had no sufficient knowledge of the forces acting on airships and he was convinced that for safety it was essential to continue the full-scale experiments on such ships which had been prematurely interrupted when the airships were put out of commission.

[One may thoroughly agree with Sir Richard Glazebrook in the matter of his opening remarks. Aeronautical engineering very acutely needs the development of a sound theoretical basis such as that which has been established for electrical work. Prof. Bairstow and Mr. Taylor appear to have made a real advance along these lines, and it is worthy of note that although it may be assumed that the Aeronautical Research Committee have contributed largely to the expense of their researches both of these gentlemen have carried out their work in fairly complete independence of official control. Research of this type can in fact be carried out effectively only by free men and not by Government institutions.]

MAJOR F. M. GREEN questioned the accuracy of Sir Geoffrey Salmond's statement that more than half the running cost of an aeroplane was the cost of fuel. The cost of fuel for an 8-seater was 5d. per mile and the running cost was certainly more than 10d. per mile.

As to gliders it seemed to him that it was difficult to get useful results from them. Full-scale tests could be made with less expense on real aeroplanes and model tests could now be accepted with greater certainty than hitherto.

[To which it may be answered that certainly for any designer who is content and proposes to continue to be content with the orthodox type of R.A.F.15 biplane the glider can be of little value. It is however a fact that not all designers are as contented as Mr. Green and to them it certainly offers the chance of making certain preliminary tests at the minimum of expense. It may be pointed out that a reasonably accurate wind-tunnel model of a braced biplane sometimes costs more than a full-sized glider.]

COMMANDER HOLDEN RICHARDSON, U.S.N., expressed his appreciation of Mr. Fairey's paper on seaplanes. Mr. Fairey had referred to the N.C.4. The hull of this type was developed entirely as the result of model tests in the tank and those tests had saved them from fatal errors of design. He himself was on N.C.3 during the attempt to cross the Atlantic. They were forced down in a storm and landed badly damaging the wings. They spent 55 hours on the water in a storm and had opportunities of judging the seaworthiness of the boat.

From this experience he could say that he would not propose again to build a short-hulled flying-boat of that type. The seaplane had a great future—it could handle loads which could not be touched by other types of aeroplane, and he was sure that the landing speed could still be greatly increased—certainly for smooth water. They had had great controversy in America on the single or twin-float seaplane. He himself had proposed—at a time when the single-float only was in use there—to build a twin-float seaplane in order to prove that the type was no good. "And," he added, "the durned thing worked perfectly."

He agreed as to the need for extended tests to settle the merits of any type. You could not obtain any useful evidence from a single specimen. Each type must be tested in numbers in actual service.

BRIGADIER-GENERAL BAGNALL-WILD, Director of Research at the Air Ministry, but on this occasion representing the Institution of Automobile Engineers, said that there was more relationship between the lorry engine and the engine of a

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really commercial aeroplane than is commonly thought. He was of the opinion that there should be much closer co-operation between institutions connected with aviation and those connected with automobiles. [On the former statement one cordially agrees with Gen. Bagnall-Wild but having had something over 25 years' experience of assorted automobile institutions all over the United Kingdom and Ireland one is firmly of the opinion that the less aviation has to do with automobilism the better for aviation. One has only to recall the fatuous methods adopted in connection with such aero-shows as have been held in this country to be convinced on this point. And as to purely technical matters what respect can technical aviation people have for a trade which puts the back-gear of a lathe inside an aluminum case and calls it a gear box?]

Prof. T. Melville Jones expressed profound dissatisfaction with the present high landing speed of commercial aircraft. High loading and high landing speed spelt economy—and the economy was calculable. It meant reduced safety—but safety could not be calculated.

He wanted the same safety in aeroplanes as one has in trains. It was a very human tendency to calculate economy and to hope to hold off danger by the skill of the pilot but it was the danger that kept the man in the street out of aeroplanes and this was not economy. He thought that we must lay down what he might call a "maximum minimum speed." He had not nerve enough to say what that speed ought to be but he thought it must be below fifty miles an hour though it need not be below 30 m.p.h. because if such were the minimum speed they would not be able to kill anybody.

[Agreeing generally with Prof. Jones one would merely ask, what about side-slips in landing? Also one would point out that the fixing of a definite landing speed is the wrong way to go about the business. Prof. Jones argued that it was a reasonable risk to fly into a tree at 40 m.p.h. on an Avro, but quite a different matter if the speed were 50-55 m.p.h. But one may point out that the risk becomes unreasonable again even at 40 m.p.h. if one is in the nose of a "pusher" type machine. As the arrangement and to a large extent the construction of the particular machine affects the safe speed for collisions of this kind a fixed speed would restrict design and might defeat its own object by perpetuating a type of machine in itself unsafe but favourable for the development of a low stalling speed.]

Continuing Prof. Jones said that another point—one on which he proposed to harp until it was remedied—was the absence of turn indicators on commercial machines. They were of the utmost importance to safety—yet they were not used.

Sir Alexander Denny (British Engineering Standards Committee) referred to the model full-scale difficulty in aeronautics. In shipbuilding the model test had proved to be reliable, and they had now extended the method to testing ship propellers. There were difficulties—but they were being overcome. He thought the ship designers' experience was a good omen for the future of aeronautical model testing.

[One suggests that unfortunately the two cases are not on the same footing. The most important cause for the discrepancy between model and full-scale in aeronautics can very fortunately be ignored without serious error in the case of the ship model.]

He then referred to the work of the British Engineering Standards Committee—and announced the willingness of this committee to undertake any amount of useful work which might be put forward by responsible bodies in any branch of engineering.

Mr. Handley Page said that he agreed, and also disagreed, with Prof. Jones. He quite agreed as to the need of slow landing—Handley Page machine did land slowly. As to the turn indicator they had tried three types and they were none of them satisfactory. If satisfactory instruments were forthcoming they would use them. He could not accept Mr. Fairey's structure-weight figures for large aeroplanes. The curve shown depended on three machines at the large end, and the structure-weights of two Handley Pages were greatly overstated. If these figures were corrected the shape of the curve became quite different.

Sir Sefton Brancker to whom the Chairman referred as "that well-known and careful pilot" deprecated the agitation in favour of low landing speeds. Engine failures should not occur—and they were the only cause of danger from high speed. Fast landing was safe on proper aerodromes—and they had not had one accident attributable to high-speed landing. The only aim of the aeroplane was speed, and to curtail it in order to land slowly was to give up the only advantage the aeroplane possessed. The problem of providing a safe get-off was more important than that of slow landing.

[General Brancker seems here to be suffering from an unusual pessimism. The problem to be faced is not that of reducing the overall speed of aeroplanes. It is that of extending the speed-range at both ends—and it is not an insoluble one. Also it is in fact the same problem as that of providing a safe get-off.]

The Replies.

Sir Geoffrey Salmond said his conscience was stricken because he had not said anything about what they had not done. They had not succeeded in developing a satisfactory gear transmission for the multiple-engine central engine-room type of machine. They had not investigated the thick wing. They had not yet developed a metal machine economical to build. They had not evolved the perfect turn indicator. But he was doing his best to satisfy the demands of both civil and military aviation for research.

He had been struck by the fact that in civil aviation success came down to the question of research—for safety and reliability. Aeroplanes must be able to land in a confined space. Efforts were being made to make it possible to land in fogs. Public opinion was affected by accidents which had nothing to do with civil aviation.

The achievement of control above the stalling angle should go far towards securing safety. The problem of fog-landing was the biggest and most difficult one that had to be faced. The development of the three-engined type was another advance. One of their needs was the development of a cheap commercial engine of about 450 h.p. This could be somewhat heavier than present types provided it gave something like 1,000 hours between overhauls.

In reply to sundry interruptions by Mr. Calthrop, Sir Geoffrey said that the parachute had never been dropped—they had not yet achieved the 100 per cent. reliable parachute and he hesitated to issue the 95 per cent. one to the service. All new service machines were however fitted to carry parachutes.

As to Mr. Green's remarks they could not afford to neglect gliding because they did not yet know where it might lead.

He would see what could be done towards issuing reports more quickly but they had to avoid the risk of misleading by publishing undigested reports.

They had tried to make strict comparative tests of float and boat seaplanes—but accidents had intervened. He hoped to carry out the tests this year.

Other distinguished persons than Gen. Brancker objected to the emphasis which was sometimes laid upon the subject of landing speed. A distinguished foreigner [Possibly Dr. Rohrbach] had said that aeroplanes were made for speed and he considered his landing speed last of all, for engines should be made not to stop. This was a matter of opinion however and investigation must continue.

Lt.-Col. Ogilvie disagreed entirely from Sir Sefton Brancker on the subject of engine failure. It ought not to occur, but it did and would occur. Complete reliability was impossible and they were not justified in counting on it. He was sure that it was wrong to accept unlimited landing speeds.

He thought that the drawing up of specifications for commercial aircraft by the Ministry was wrong. Tenders should go direct from the manufacturers to the users, in this case the air lines, who should specify their requirements.

Mr. C. R. Fairey thought he had got off very lightly in the discussion considering the controversial nature of his subject. He agreed with Commander Bird that the high thrust line of the boat could be overcome. But only at the cost of downward pressure on the tail and a loss in performance. He did not agree as to the lower risk of loss through hull damage in the boat type. You could bulkhead a float longitudinally to any extent—you could not make anything ahead of the wings of a boat really watertight.

He thought Commander Richardson's remarks as to the N.C.-type of hull adrift at sea confirmed his statement as to the relative disadvantage of the single-step type under these conditions.

As to Mr. Handley Page's remarks on the structure-weight curve, he had based his curves on the figures published in *All the World's Aircraft*. Whatever you did did not alter the general run of the curve. Actually official figures put the Handley Page structure-weights even higher than those he had taken. The general form of the curves was perfectly reasonable.

To put floats on a single-seat scout was a structural outrage. The weight of floats decreased relatively with size—so the seaplane got better—at any rate for a time—as it got larger. A similar process occurred with the boat. The aeroplane after a time got worse as it got larger. However one played with the figures the result was the same—that the seaplane was at its best in large sizes.

The world unfortunately was built on too large a scale for the modern aeroplane—and the fact that the seaplane could be built in larger sizes than now existed held out the hope of building aircraft big enough to cross the great oceans.

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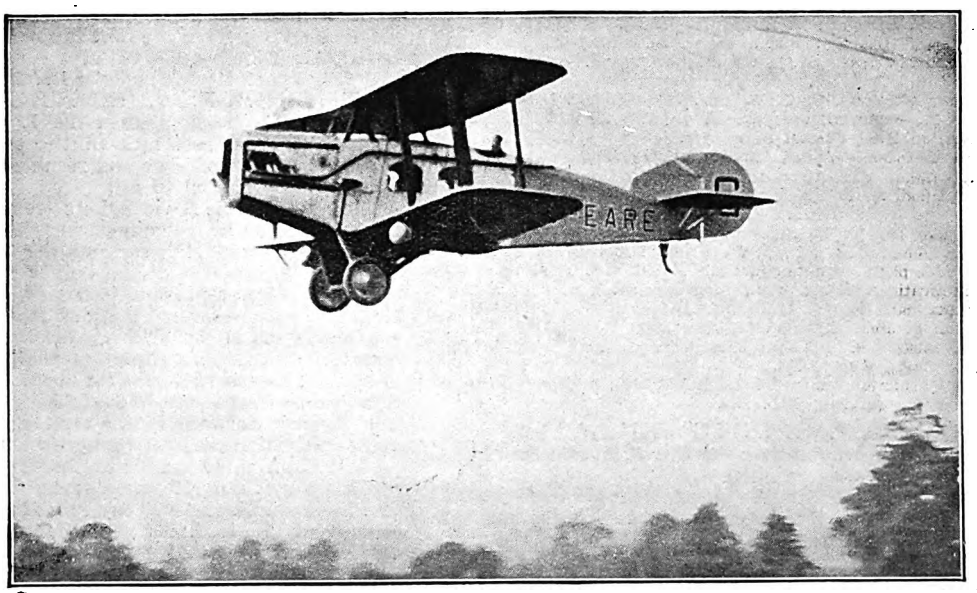

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R.A.F. INTELLIGENCE.

Appointments.

AIR MINISTRY, Feb. 15th.

GENERAL DUTIES BRANCH.—Wing/Cmdr. C. T. Maclean, D.S.O., M.C., from Half-pay List to R.A.F. Depot (Supernumerary), 2/2.

S/Ldrs. R. B. Ward, A.F.C., from School of Naval Co-operation and Aerial Navigation to Aeronautical Committee of Guarantee, Germany, for duty with British Section, 17/1; A. J. Miley, O.B.E., from R.A.F. Depot to command No. 267 Squadron (Mediterranean), 6/2; A. H. Peck, D.S.O., M.C., from No. 2 F.T.S. to command No. 25 Squadron, Constantinople Wing, 6/2; A. N. Gallehawk, A.F.C., from R.A.F. Base, Leuchars, to H.Q., Coastal Area (Supernumerary), 14/2

F/Lts. R. E. Nicholl, from H.Q., R.A.F., Iraq, to No. 8 Squadron, Iraq, 16/8; T. Henderson, M.C., A.F.C., from No. 100 Squadron to R.A.F. Depot (Supernumerary), 2/2 (the notification concerning this officer, dated 9/2/23, is hereby cancelled); W. T. S. Williams, D.S.C., from Air Ministry (Dept. of A.M.P.) (D.D.O.) to R.A.F. Depot (supernumerary), 14/2; the Hon. J. H. R. Rodney, M.C., from No. 24 Squadron to Air Ministry (Dept. of A.M.P.) (D.D.O.), 14/2; A. Durston, A.F.C., from H.M.S. "Argus" to No. 267 Squadron, Mediterranean, 5/1; J. A. Sadler, from H.M.S. "Argus" to H.M.S. "Ark Royal," Mediterranean, 13/10; W. R. Curtis, from H.M.S. "Argus" to H.M.S. "Ark Royal," Mediterranean, 17/11.

Capt. A. H. K. Jackson, D.S.O., M.C. (R. War. Reg.), to H.Q., R.A.F., Iraq, on attachment to R.A.F. for duty as G.S.O., 3rd Grade, at Basrah Group H.Q. (on formation), 21/9, and from H.Q., Iraq Command to Basrah Group H.Q., for duty as Liaison Officer, G.S.O., 3rd Grade, 1/10.

STORES BRANCH.—S/Ldrs. F. C. Williams, O.B.E., from R.A.F. Depot to H.Q., R.A.F., Cranwell, 9/2; W. F. Bryant, from H.Q., R.A.F., Mediterranean, to H.Q., Coastal Area, 27/1.

ACCOUNTANT OFFICERS.—S/Ldrs. H. E. Rowley, from H.Q., R.A.F., Cranwell, to Inland Area Aircraft Dept, 14/2; F/Lt. R. H. Cleverly, from No. 11 Squadron to Electrical and Wireless School, 22/1.

From "*The London Gazette*" Feb. 13th.

R.A.F. GENERAL DUTIES BRANCH.—F/O. (hon. F/Lt.) W. L. Payne, granted perm. commn. as a F/O., Nov. 9th; F/Lt. C. O. F. Modin, D.S.C., granted a perm. commn. in rank stated, Oct. 10th, 1919, since promoted (notification of Oct. 10th, 1919, appointing him to a short service commn. cancelled): S/Ldr. G. H. Thomson, O.B.E. (Payr. Cdr., R.N.), to be hon. Wing/Cmdr, Jan. 28th.

F/O. A. J. Barlow relinquishes short service commn. (ill-health), granted rank Capt., Feb. 14th.

F/O. W. E. Windover removed from R.A.F., His Majesty having no further use for his services, Feb. 2nd.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

Hockey.

R.N. v. R.A.F.—The R.A.F. fielded the same team for this game as against the Army. The ground was on the soft side and the game opened with a steady pressure by the Navy forwards, who soon forced a corner. Roupell, however, cleared, and Saint led a good rush on the Navy goal. Simpson cleared.

After half an hour's play Manners opened the scoring off a nice pass by Atkinson, the Air Force backs failing to tackle him. Immediately afterwards a good shot by Robinson was cleared by Lingard, and play again moved towards the visitors' goal, where Gilley made two marvellous saves in quick succession. Steady pressure by the Air Force led to a penalty corner, off which Saint hit through the goal, but was penalised for handling. Then a good save by Gotto spoiled a promising shot by Saint Atkinson and Woodhouse were again prominent, but Davenport and Scott-Davidson were on the top of their form. Brooks and Manners were always forceful, but they were held by Davenport and Davidson, until Brooks broke through and scored a pretty goal. The Air Force pressed again and Gotto saved a fine shot from Saint. Suddenly Sawyer scored with an excellent shot from the edge of the circle, but just after this Brooks got through again.

After the restart, the Air Force took the game completely into their hands, and good work by Reeves and Robinson led to the latter scoring. The Air Force continued to press, but could not break through. Two good chances were missed, but no further scoring resulted. The game ended with the score: Navy 3, R.A.F. 2.

Gilley in goal was brilliant, and Davenport, Scott-Davidson and Smyth were the best of the team in which everyone played very well.

R.A.F. Officers' Golfing Association.

The spring meeting of the Association will be held at Berkhampstead on the following dates:—

April 18th.—Team competition, 18 holes, 3 players in each team. Foursome competition, 18 holes medal play.

April 19th.—36 holes Eclectic Bogey competition. April 20th.—36 holes Stroke competitions.

Notices and entry forms will be sent in due course to all members of the Association, and inquiries for further particulars should be addressed to the Honorary Secretary, F/Lt. C. H. Hayward, R.A.F. Staff College, Andover, Hants.

The membership of the Association is at present small and it is hoped that every officer in the Service who plays golf or who is interested in the game will join. There is no subscription, but all new members pay 5s. entrance fee, which entitles them to play in the two annual meetings of the Association, the R.A.F.G.A. handbook, and all notices and reports in connection with the activities of the Association.

Fencing.

The R.A.F. beat the Army at Bertrand's Fencing Academy on February 16th by 24 points to 12. The Air Force won the foil by 6—3, the epée by 5—4, the sabre by 6—3, and the bayonet by 7—2. In the epée contest the score stood at 4 all with one fight to be decided. In this fight, F/Lt. Sherriff emerged the victor, and thus gave the victory to the R.A.F.

The individual results were: Foil.—F/Lt. Sherriff (3 wins), Sjt.-Maj. Grainger (3 wins), S/Ldr. Darley (0 win).

Epée.—F/Lt. Sheriff (2 wins), Sjt.-Maj. Grainger (2 wins), S/Ldr. Darley (1 win).

Sabre.—F/Lt. Sherriff (2 wins), Sjt.-Maj. Grainger (1 win), Sjt.-Maj. Stollery (3 wins).

Bayonet.—F/Lt. Sherriff (3 wins), Sjt.-Maj. Grainger (3 wins), Cpl. Dunkley (1 win).

NOTE.—All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to THE AEROPLANE should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.

(Unofficial Report.)

THE R.A.F. v. R.N. RUGBY MATCH.

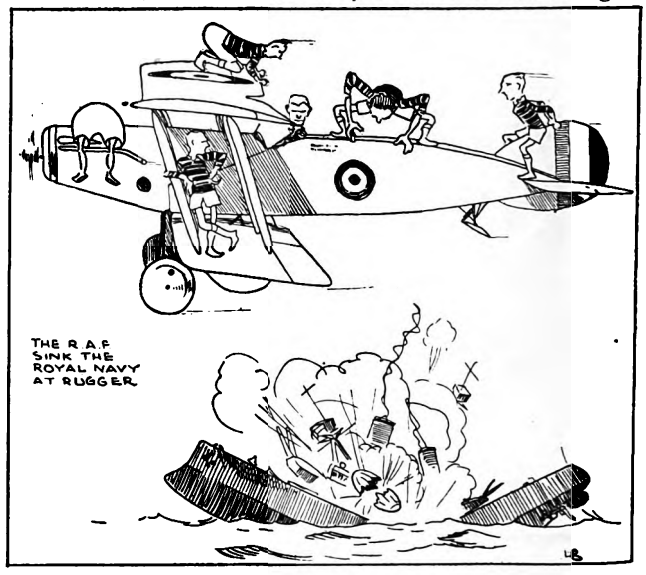
The R.A.F. match against the Royal Navy took place at Twickenham on Feb. 14th in the presence of Group/Capt. H.R.H. the Duke of York and resulted in a win for the R.A.F. by one try (3 points) to nil.

The visibility at Twickenham was very poor owing to a thick mist, and heavy rain during the earlier part of the day made the ground slippery and the ball heavy and greasy. These trifles however do not bother Service teams much and certainly did not prevent it from being the finest game of Rugger one has ever had the luck to watch. The Navy fielded a fine side which included six Internationals and an English reserve. There were three Internationals in their pack but in spite of this it was only for about the first 10 minutes that they were a match for Wakefield and his pack.

A gigantic forward battle went on throughout the whole match, in which the R.A.F. more than held their own. They packed down tight and hard, heeled out like lightning and broke up quickly. It was a triumph of forward play. Outside the scrum if there is any special praise for any one player on a great side it should go to S/Ldr. Russell the scrum-half who, when he didn't get the ball himself, marked the Navy's famous scrum-half and cramped his style considerably.

The game started with a brisk attack by the Navy, Lieut.-Commander Davis starting a good passing movement, but they soon found themselves up against the R.A.F. defence. The clean, hard tackling of the Air Force backs was one of the best things in the game—it never failed. Apparently unable to believe their own eyes the Navy tried again. A further series of dull thuds, with the Air Force uppermost, a long kick by the R.A.F. full-back and the ball was back again in the Navy's half. Twice F/Lt. Bryson bagged a brace, in other words tackled his opposite number, took off again and crashed the wing man. The R.A.F. three-quarters certainly have nothing to learn about tackling.

In addition, L/AC. Runham at full-back played a very sound game. He had not so much work to do as Gilbert, the Navy's back, and his fielding is not so sure, which is natural considering that Gilbert is the English full-back, but he was cool and steady and kicked a heavy ball a tremendous length.



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Altitude Record beaten

by Casale on Bleriot Spad—56 Jupiter engine with 250 kilo load.
Height : 7,200 metres.
Previous record : 6,782 metres.

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ENGLAND.

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FOR MARINE AIRCRAFT

Gained by THE SUPERMARINE, "Sea Lion II" Single Seater Amphibian Flying Boat, when winning back for England the Schneider Cup at Naples, August, 1922.

Duration of 1 hour 34 mins. 51⅘ secs.

Longest Distance Accomplished 230 miles.

Fastest Time for 100 Kilometres / 62 miles — 28 mins. 41⅘ secs.

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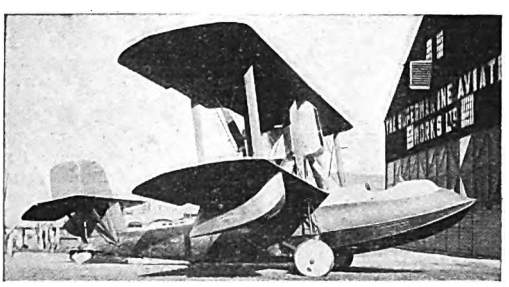

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450 h.p. Napier Lion.
Winner of the International Race for the Schneider Cup at Naples, 1922.

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One doubts his ability to stop such a player as Gracie for instance on a dry ground with a clear run but fortunately he is unlikely to be asked to, this year at any rate.

This failure to get past the R.A.F. defences resulted in a change in the Navy's tactics. Lieut.-Cmdr. Davies started kicking over the heads of the three-quarters. Runham was equal to the occasion both in fielding and finding touch or alternatively going down on the ball.

By this time the R.A.F. forwards had really got going and Russell was getting the ball. Opportunities were lost by the three-quarters' fumbling. If they lost the ball however their nerve was all right and the Navy did not get much advantage. A splendid save, followed up by a more than useful punt into touch by F/Lt. Riddle led up to a great rush by the Air Force forwards, F/Lt. Simpson going over and scoring the only try of the game. The very difficult place kick failed.

The whole of the second half was a pitched battle between the forwards varied with a couple of attempts by the Navy to drop goals. Headed by Wakefield the R.A.F. made rush after rush and several times only the Navy's full-back stood between them and a higher score. But Gilbert never made a mistake and his mighty kicks drove them back. The Navy made a desperate attempt to turn the game in the last 10 minutes but the R.A.F. held them well.

In spite of the narrow margin of points the Navy were well beaten. They were beaten in the scrum, beaten in the loose and outplayed behind the scrum. This is the first time the R.A.F. have beaten the Navy but one does not imagine it will be the last.—C. M. MCA.

The teams were:—R.A.F.—L/AC. Runham (Manston), back; L/AC. Snaith (Netheravon), F/Lt. C. B. Riddle (Gosport), F/Lt. O. C. Bryson (Farnborough), and F/Lt. C. N. Lowe (Cadet College Cranwell), three-quarters; F/Lt. H. G. White (Old Sarum) and S/Ldr. J. C. Russell (Uxbridge), half-backs; F/Lt. W. W. Wakefield (Uxbridge), F/Lt. R. H. C. Usher (Netheravon), F/Lt. S. P. Simpson (Cadet College, Cranwell), F/O. C. D. Adams (Netheravon), F/O. J. S. Chick (Farnborough), P/O. E. B. Coventry (Upavon), F/Sjt. Smith (Gosport) and A. C. Collins (Flowerdown), forwards.

R.N.—Chief-Shipwright F. Gilbert, back; E.-R.A. Jones, Lieut. J. Burnett, Sub-Lieut. J. H. Huntley and Lieut. J. W. Rayner, three-quarters; Constructor-Lieut.-Cmdr. W. J. A. Davies and Lieut. C. A. Kershaw, half-backs; Lieut. C. F. G. T. Hallaran, Pte. E. R. Gardner, P/O. W. E. G. Luddington, Lieut. R. S. Benson, E.-R.A. E. H. Harding, Lieut. W. C. T. Eyres, Sub-Lieut. J. D. Dale and Lieut. D. Orr-Ewing, forwards.

No. 55 Squadron Dinner.

55 Squadron will hold its 5th Annual Dinner at the Imperial Restaurant, better known as Oddenino's, 70-2, Regent St., on Sat., Feb. 24th, at 7.45 p.m. All past and present officers of the Squadron who intend to be present, and who have not already done so, should apply forthwith to Wing/Cdr. J. E. A. Baldwin, D.S.O., R.A.F. Staff College, Andover.

The School of Military Administration.

The following officers of the R.A.F. have satisfactorily passed the Junior Officers' Course, No. 4, at the Army's School of Military Administration, Chisledon:—S/Ldr. G. S. M. Insall, V.C., F/Lt. E. R. Whitehouse, F/Lt. F. H. Coleman, F/O. G. L. Ormerod, F/O. W. D. Gairdner, F/O. C. V. Lacy.

An Award.

At the monthly meeting of the committee of the Royal Humane Society on Feb. 13th a bronze medal was awarded to F/Lt. E. J. P. Burling, R.A.F., for gallantry in saving a man under the most difficult and dangerous conditions when their flying-boat was obliged to come down and was wrecked in a heavy sea off Swanage on Sept. 12th.

Floating Docks for Seaplanes.

It is interesting to note that in his recent excellent lecture before the Royal Aeronautical Society, W/Cmdr. Cave-Brown-Cave, O.C. Experimental Station, Isle of Grain, referred to the floating dock for seaplanes which has recently been put into commission after being constructed at Sheerness Dockyard to designs produced conjointly by the Admiralty and the Air Ministry. The production of this floating dock marks a distinct advance in the use of aircraft in co-operation with the Navy and indicates that the Admiralty is becoming more and more alive to the importance of air work.

It is in fact only a short time since the Air Ministry has been in a position to interest itself in such an engineering construction as this floating dock but one knows that the officers of the sea-going side of the R.A.F., especially those who were formally R.N.A.S. officers, have realised the necessity for floating docks for many years. So far back as 1913 Mr. Oswald Short and the late Mr. Horace Short prepared drawings and had a working drawing made of a floating dock and Mr. Winston Churchill himself who was then First Lord of the Admiralty was one of those who came to see the model working at the old factory of Short Brothers at Eastchurch.

One well remembers that at the time the R.N.A.S. officers who were then at Eastchurch were very keenly interested in the project and there is no doubt that if the Navy had during the War ever realised the importance of aircraft the Short floating dock for seaplanes would have been a comparatively common object of the seascape. It is therefore all to the credit of the Technical Department at the Air Ministry that attention should have been turned to this important subject as soon as opportunity offered.

The moral evidently is that the present race for aerial supremacy calls for the most rapid possible acceptance of the ideas of those aircraft constructors and inventors whose record has proved that reliance can be placed upon the product of their brains.

PERSONAL NOTICES.

DEATHS.

BRADLEY.—On February 6th, in Transjordania, as the result of an accident to the Baghdad-Cairo Air Mail, Harold Joseph Bradley, F/O., 45 Squadron, R.A.F. The machine made a forced landing about 100 miles east of Amman and overturned, Mr. Bradley being suffocated. The passengers were unhurt.

CHAMBERS.—On February 2nd, as the result of a flying accident at Spittlegate, near Grantham, F/O. Cyril Chambers, R.A.F.

HICKS.—On December 27th at 979, Almirante Brown, Temperley, Buenos Aires, Charles Lionel Hawtrey Hicks, late Capt. R.A.F., husband of Lily Hicks, and youngest son of Captain John Hicks, R.N., of The Moorings, Sevenoaks, and The Oaks, Halifax, Nova Scotia, aged 39

WILBY.—On February 1st, Ronald Burdett Wilby, R.N.A.S., son of Mr. and Mrs Burdett Wilby, New Barnet, aged 23.

ENGAGEMENTS.

CASSIDY—DREW.—The engagement is announced of John Reginald Cassidy, F/Lt., R.A.F., youngest son of Mrs. F. Cassidy, of Dalby, Queensland, Australia, to Barbara Margaret, elder daughter of H. R. Drew and Mrs. Drew, of Margery Wood, Reigate.

CLARKE—WILDER.—The engagement is announced, and the marriage will take place quietly in March, of Captain Edward G. H. Clarke, M.C., the East Surrey Regiment, late R.A.F., younger son of the late Captain Charles Clarke and Mrs. Clarke, and Cornelia Martin, second daughter of General W. E. Wilder, United States Army (retired), of Newport, R.I., and the late Mrs. Wilder.

GREENE—LEATHER.—The engagement is announced and the marriage will shortly take place of Mr. Geoffrey Plunket Conyngham Greene (late F/Lt., R.N.A.S., of Waterpoort, Northern Transvaal, younger son of Sir Conyngham Greene, G.C.M.G., K.C.B., and Lady Lily Greene, of Belmore House, Lymington, Hants, and Daphne Margaret, only daughter of Colonel and Mrs. Gerard Leather, of Middleton Hall, Belford, Northumberland.

HOWARTH—COGILL.—The engagement is announced between Peter Howarth, A.R.C.A., D.F.C., son of Mr. Peter Howarth and Mrs. Howarth, of Accrington, and Zema, daughter of Mr. W. H. Cogill and Mrs. Cogill, Arcadia, Pretoria, South Africa.

ROBINSON—THRELFALL.—The engagement is announced of George Leonard Robinson, D.S.O., chaplain, R.A.F., son of the late Rev. Joseph Robinson, and Carolyn Threlfall, widow of Colin Stafford Threlfall, and youngest daughter of the late Thomas Tunnicliff, of Manchester.

SANDERSON—DALY.—An engagement is announced between F/Lt. A. C. Sanderson, D.F.C., R.A.F., only surviving son of Mr. A. Sanderson, Kingshall Road, Beckenham, Kent, and Hazel, younger daughter of Capt. and Mrs. Bernard Daly, Templeogue House, Co. Dublin.

SWINBURNE—JOHNSON.—The engagement is announced between Capt. Hugh L. Swinburne, Durham Light Infantry (T.A.), late attached R.F.C. and R.A.F. (111 Squadron), of Carlton Terrace, Gateshead, and Violet Lowden Johnson, elder daughter of Mr. and Mrs. Walter W. Johnson, of Castleton, West Park, Leeds.

THOMAS—TORRANCE.—The engagement is announced between Mr. H. Hamshaw Thomas, M.B.E., M.A. (Capt., late R.A.F.), Dean and Steward of Downing College, Cambridge, and Miss E. Gertrude Torrance, M.A., daughter of Mr. and Mrs. John Torrance, of Cape Town Town, South Africa.

WEBSTER—JONAS.—The engagement is announced between F/Lt. E. J. Webster, D.F.C., R.A.F., grandson of Mr. E. W. Martin, J.P., of the Manor House, Ewell, Surrey, and Dorothy Marguerite, elder daughter of Mr. and Mrs. F. G. Jonas, of Wood Lea, Woldingham, Surrey.

MARRIAGE.

HEMMING—WOODS.—February 7th, 1923, at St. Comgall's Parish Church, Bangor, County Down, by the Rev. Canon Carey, M.A., F/O. Geoffrey W Hemming, D.S.C., R.A.F., son of Mr. and Mrs. W. F. Hemming, of Grove Hill, Worcester, to Dorothy May, only daughter of Mr. and Mrs. R. J. Woods, of Princetown Lodge, Bangor, County Down.

HUGHES—VIDAL.—On Jan. 8th., at St. Eunice Church, Sydney, Geoffrey Forrest Hughes, M.C., A.F.C., only surviving son of Sir Thomas and Lady Hughes, to Margaret Eyre Sealy, younger daughter of Rev. G. S. S. and Mrs. Vidal.

KEMSLEY—MADGE.—On the 6th inst., at St. Mary's Church, Beddington, Capt. Nevill Malcolm Kemsley, A.F.C., son of Mrs. C. Kemsley and the late Mr. James Kemsley, South Africa, to Norah Elizabeth, only daughter of Mrs. F. E. Madge, of Walton House, Wallington, and the late Mr. William Friend Madge.

MEEK—PEARCE.—On January 20th, at St. Thomas's, Portman Square, F/O. Kenneth Alexander Meek, M.B.E., R.A.F., to Mary Victoria Bird Pearce.

STRUDWICK—SANDEMAN.—On Jan. 27th, at St. Peter's Church, Brighton, Charles R. Strudwick, R.A.F., second son of the late the

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Rev. R. J. A. Strudwick, to Mary Elizabeth, only daughter of Mr and Mrs. Ernest Sandeman, of Clarendon Mansions, Brighton.

YUILLE—SILVERWOOD COPE.—On Jan. 18th, at Holy Trinity Church, Brompton, Archibald Buchanan Yuille, D.F.C., elder son of Mr. and Mrs. Herbert Buchanan Yuille, of Harescombe, Northwood, to Cecilia Frances Silverwood Cope, eldest daughter of Mr. and Mrs. William Silverwood Cope, of 24, Collingham Gardens, S.W.

BIRTHS.

DAWES.—On January 9th, at Northdown Way, Margate, the wife of Major L. Dawes, late Middlesex Regt. and R.F.C.—a son

DEACON.—On Jan. 19th, at Moreton-in-Marsh, to F/Lt. and Mrs. G. R. A. Deacon—a daughter.

LAING.—On January 3rd, at Clifton Court, Folkestone, to Kathleen Dora, the wife of Charles McM. Laing, M.C., A.F.C., R.A.F.—a son.

LAING.—On January 28th, at 18, Glenton Road, Lee, S.E., the wife of Wing/Cmdr. G. Laing, O.B.E., R.A.F.—a daughter.

KENT.—On Jan. 15th, the wife of Lieut. Edmund Kent, R.A.F.—a son.

MULCAHY-MORGAN.—On January 10th, 1923, at 2, Bungalow, Vine Lane, Hillingdon, the wife of S/Ldr. T. W.. Mulcahy-Morgan—a son.

O'NEILL.—On January 27th, at Aldershot, the wife of F/Lt. W. H. L. O'Neill, M.C., R.A.F.—a son.

POTTER.—On January 29th, at 24, Ewell Road, Surbiton, to Jessica Potter, wife of J. R. Potter (formerly Major, R.A.F.)—a son (John David).

SMYTH-PIGOTT.—On January 9th, in Berlin, to Wing/Cmdr. and Lady Clare Smyth-Pigott—a son.

MISTAKEN IDENTITY.

The following letter has been received :—

Sir,—Headed " An Australian Contemporary," there appears in your issue of 15/11/22 (to hand to-day) a just tribute to the pioneer of aviation in Australia. The distinction (misapplied to myself) belongs to my namesake William Ewart Hart who did all the things enumerated in your paragraph and many others of scarcely less importance, and who now thrives behind a dental surgeon's brass plate at 223, Elizabeth Street, Sydney.

What little flying I have done has invariably been as a passenger; I have never crashed an aeroplane, seaplane, flying boat, glider or box-kite; have never had an opportunity to do so and probably never shall, for my sight, from birth, has been eighteen shades below normal and the prescribed tests for civil pilots seem to grow stricter as we grow older.

Far from achieving fame during the war, my 4-years' tour was made with substantive rank of private in an Australian Field Ambulance, while my injuries resulted from a distinctly minor encounter with H.E. at Passchendaele.

Aircraft, to which you so generously refer, is but a natural product of the law of evolution. After spending other people's money on journalistic propaganda for the aerial defence and commercial development of Australia, my obsession reached the stage where one aspires to a soap-box of his own and while the consequent foundation of *Aircraft* may rob my native London of its title to the only portion of the British Empire possessing an aviation journal, it endeavours to atone by bringing Australia before the European aircraft industry as an almost unlimited field.

The matter of identity has embarrassed my namesake since he and I served together on the first committee of the Australian Aero Club (New South Wales Section) which I had the temerity to form some five years ago. Tired of repudiating the other, each allowed confusion to become more confused. As one result, there was left at my office a sentimental request for an entry in a lady's autograph album, which request, duly complied with, brought a second which reads : " Having found that you are not the brave aviator who had the accident at Parramatta, I have torn out your page in disgust. Why didn't you tell me?"

To soothe the outraged feelings of your many Australian readers at home and abroad, I earnestly beg that you will at once restore " W. E." to his proper pedestal.

(Signed) EDWARD J. HART, Managing Director *Aircraft.*

VICKERS DOINGS.

The Vickers " Vixen " has been thoroughly tested at Brooklands, and its performance is satisfactory. The top speed is in the neighbourhood of 150 m.p.h., and it is hoped by " cleaning up " and some alterations considerably to increase this. The climb of the machine is very good indeed, and although it is very stable, the " Vixen " can be and has been " stunted " with ease. One understands that the machine can be readily converted to a seaplane by fitting floats, or to a single-seater fighter, in which case the wings would be cut down.

During the past week or so the Secretary of State for Air, Sir Samuel Hoare, and also the Under-Secretary, the Duke of Sutherland, with staffs " as fitted " have on separate occasions visited the Vickers works to see the " Vixen."

Representatives of foreign States, such as Czecho-Slovakia, Cuba, the Argentine, Chile, etc., have also been received at the works in connection with the " Vixen."

The second " Victoria " with two Napiers has gone to Martlesham Heath for further official acceptance tests.

Two " Viking IV's " with Rolls-Royce engines, having passed very satisfactorily their land tests at Brooklands and water tests at the Isle of Grain—at the latter place they actually got off 15 seconds after opening out the engine, with full load—have been sent to the Argentine for the River Plate Aviation Co.—J. F. S.

A SHORT NOTE.

In view of the fact that the famous firm of Short Bros. (Rochester and Bedford) Ltd. have been so successfully engaged in the construction of all-metal aeroplanes it is of interest to note that the firm has registered the word " Metoplane " as the trade-mark for Short all-metal aeroplanes.

COMPANY NEWS.

SEAPLANE AND PLEASURE TRIP CO. LTD. (187,652).—Private company. Registered February 7th. Capital £300 in 1s. shares. To carry on the business of carriers of fare-paying passengers by seaplane, airship, aeroplane, glider, motor-boat, car, char-a-banc or other vehicle, ship or boat, etc. The first directors are :—

H. P. Willsher, 5, Kempson Road, Fulham, S.W., Manager.
E. O. Cohen, Clock House, Byfleet, Surrey, Merchant.

Qualification 1 share. Secretary :—Miss O. Whiteley, Merser Motor Works, Concannon Road, Aire Lane, Brixton, S.W.2.

BRITISH ANZANI ENGINE CO. LTD.—Satisfaction to the extent of £480, on December 30th, 1922, of debentures dated September 28th, 1921, securing £2,400.

THE ROAD GLIDER.

Some little time ago, in connection with certain bombing trials in the Solent, one had the pleasure of making the journey to Gosport and back on one of the Napier trial cars in company with Mr. F. Hazell Jones, of Napiers. On this occasion, instead of driving the car oneself one sat in the back seat as a passenger, and so obtained quite a new impression of the car.

So far as actual smoothness of running was concerned it was very distinctly preferable to any railway carriage, though as it was a windy day one wished that a wind screen had been fitted for the back seats. It was quite impossible to tell at any time whether the engine was running or whether it was not, and there was nothing to indicate to any of the senses that the car possessed such a thing as a gear-box or a differential.

On a very bad road one felt a series of dull thuds such as one feels when in a first-class railway carriage when the train is running over points. At any speed and on any kind of road there was, thanks to the Napier anti-rolling device, far less rolling than there is in a railway carriage.

We made the return journey by the Meon Valley road, which is very hilly and has some very bad corners, but also has long, fast, straight stretches. Personally one knows that road by heart, but our driver did not. Consequently after leaving Gosport for home, being somewhat in a hurry, one kept on feeling annoyed because the driver crawled round the corners so carefully, and seemed to be driving altogether unreasonably slowly out of respect for his nice clean paint. After a while, thinking that we were going to be very late back into town, one looked at the time, and found we had been just an hour out of Gosport. A few seconds afterwards we passed the thirty-sixth milestone from Gosport, which meant that we were between 34 and 35 miles from our start.

Thus it would appear that the impression of slowness was somewhat illusive, seeing that to do 30 miles in the hour one has to travel at approximately 40 nearly all the way. Altogether the car more than confirmed the high opinion one had formed of the Napier from one's experience of it a year before.

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COMMERCIAL AERONAUTICS.

AIR LINE ARRIVALS AND DEPARTURES.
ANALYSIS OF FIGURES.

For week ending Feb. 11th :—

LONDON—PARIS :

Handley Page Transport, Ltd., machines 6*, passengers 35, de Havilland Aircraft Company (Night and Special Service), machines 1, passengers 1; Air Union, machines 8†, passengers 14; Total machines, 15, passengers 50.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 4*, passengers 13.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 6, passengers, Manchester-London, 9, London-Amsterdam, 0.

LONDON—ROTTERDAM :

K.L.M., machines 1, passengers 3.

Total number of trips: British machines 17, carrying 58 pas.; Foreign machines 9, carrying 17 pas.

Trips per day.—Monday, 5; Tuesday, 9; Wednesday, 0; Thursday, 4; Friday, 15; Saturday, 13; Sunday, 4.

STATISTICS.

Machines, 26; Passengers, 75; Crews, 49; Total Personnel, 124.

Corresponding week last year :—

Machines, 30; Passengers, 57; Crews, 47; Total Personnel, 104.

Corresponding week, 1921 :—

Machines, 29; Passengers, 32; Crews, 35; Total Personnel, 67.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

THE AIRCRAFT DISPOSAL CO.

On Sunday of last week Capt. Rex Stocken and Mr. Perry were testing various machines for the benefit of a party of visitors. Capt. Stocken was up first on an Avro and then he changed to a Bristol Fighter and Mr. Perry gave an exceedingly pretty demonstration on a "Tinsyde."

On Monday Capt. Stocken was testing another "Tinsyde" and Mr. Perry was giving the same machine further tests on Thursday and Friday.

THE AIR-LINES.

Although the phenomenon has not yet manifested itself it is still believed at Croydon that there is some truth in the late Mr. Shelley's dictum that "Spring-time will soon be here." This statement is however somewhat qualified by a condition anent the coming of Winter. The whole position is made more difficult by the lack of any early data enabling one to ascertain whether the present muggy-cold spell of weather which has been enduring seemingly for many dynasties is Winter in fact or whether we have yet to meet this phenomenon (outside the office of D. Napier & Son Ltd.). In other words, everyone is longing for the sunshine, especially the pilots and officials of the air-lines.

Wednesday and Thursday were each blank days and there was no cross-Channel traffic owing to fog but Friday and Saturday were both good and all machines scheduled crossed safely.

On Friday Mr. Hubert Broad on a D.H.9 successfully completed his second night flight to Paris. He left Croydon at 17.10 hrs. and reached Paris at 22.45 hrs. after a stop at Lympne.

On Tuesday and Thursday an R.A.F. Bristol "Fighter" carried out some night-landing tests at Croydon.

The Surrey Flying Services are having quite a number of joy-riders again and Mr. Muir and Mr. Youell were up in the Avro every day except Tuesday and Wednesday. On Saturday they were quite busy, and on Sunday, when it was dark or on the verge of snowing in London, they took up seventy (70) passengers.

SAY IT WITH—SMOKE.

Mr. Bradly and Mr. MacMullin both of whom were with the Instone Air-Line have now joined Major Jack Savage's select band of sky-writers. Mr. Bradly has for some time been particularly keen on this work and as one believes they are both to join the American contingent of the concern they will do much to cheer up that desiccated land Mr. Bradly at any rate is bound to get a cinch on little ole Noo York with his "Brighter-London landings," which doubtless will soon be all the rage "over there."—G. D.

Romford.

Mr. Pudney who, with Mr. R. F. Little late of the Ingham and Little joy-riding concern as his ground engineer, has been doing a lot of work at Romford lately with G-EAJZ a 110 Le Rhône Avro. On the last two Sundays Mr. Pudney took up 73 and 68 paying passengers respectively. Owing to bad weather on weekdays the firm only added about 10 to the total figure. A charge of 7s. 6d. is made per passenger.

The aerodrome is situated at Gidea Park about one mile from the town and as no charge is made for admittance a crowd of about 2,000 people gathers there every Sunday. Considerable difficulty is experienced in keeping a space clear for landing.

A Triumph of British Design and Workmanship.

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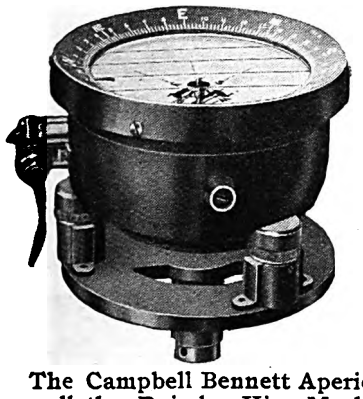

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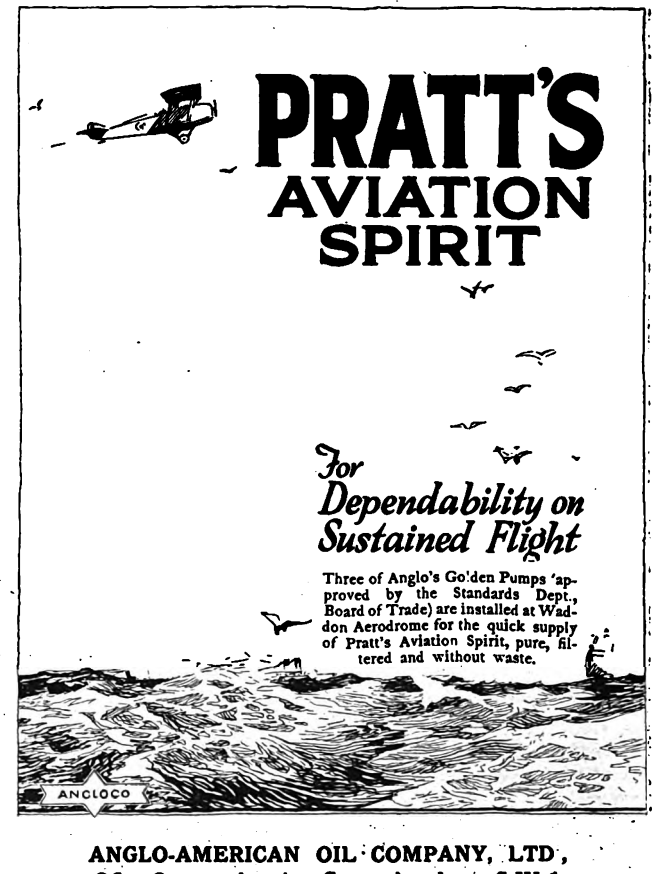
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ON THINGS IN GENERAL.

ON IRAQ AGAIN.

What has happened to the *Daily Express* and/or Lord Beaverbrook? There was a time when it did quite good work for the Flying Services and had a strong Imperialist flavour. The *Daily Mail* too was by way of being Imperialist. Now both these papers keep on squealing for Great Britain to get out of Iraq, and in support of their agitation can find no better argument than the expenditure of some millions of pounds in that country during 1919-20 and 21 while the un-mobilised Army was still in possession and before the axed and economised Air Force was put in control.

It is already evident that the Air Force is doing its job and doing it well in Iraq at a price which Iraq itself ought soon be able to pay. But the "Get out of Iraq" agitation still goes on. And the latest weapon employed by Lord Beaverbrook's organ is a peculiarly mean charge against the R.A.F. to the effect that our aeroplanes are bombing the Arabs to make them pay their taxes. Apparently the charge, or perhaps one should rather call it a suggestion or an innuendo, originated—according to the *Daily Express* itself—in "a speech made by Lord Beaverbrook himself at Poole during the last general election. In that speech he quoted Captain Guest as saying that two British aeroplanes had supported the Emir Abdullah, the ruler of trans-Jordania, in a tax-collecting expedition."

The *Daily Express* continues:—"Defending his Arabian estimates in the House of Commons on March 31st last Captain Guest said: 'There the prestige of the Air Force is very high, as was proved on a recent occasion, when the Emir Abdullah found it necessary to send a force to visit the district of Kerak, where there was constant faction fighting *and no taxes were being paid.*'"

On February 21st Sir Samuel Hoare, our new Air Minister, denied flatly that the Air Force had been used to collect taxes from Arabs under threat of bombs, and the *Daily Express* quotes the foregoing statement by Captain Guest to prove, or to suggest or insinuate, that the official at the Air Ministry who drafted the Air Minister's answer, if not Sir Samuel Hoare himself, is a liar. And it ends by saying "Captain Guest's statement is quite enough to justify anything that has been published in the *Daily Express* on this question."

The attempt of the *Express* to get out of looking foolish is almost too ludicrous to be worth attention were it not for the fact that certain of the weaker brethren are still hazy about the Iraq and trans-Jordania business. But as things are it seems worth while to say a few words on the subject.

A Parallel Case.

Take a parallel case, the present state of Ireland. There "there is constant faction fighting and no taxes are being paid." Ireland being now a self-determined Free State, according to the doctrines of Mr. Lloyd George, President Wilson and company, we are not interested in her taxes. But every decent person in Ireland is praying for English regular troops to come back and flatten out the faction fights between De Valera's "bogsturm" and the Free State "re-fusiliers" as the inimitable Mr. Bretherton calls them. In fact one is told that in Dublin the betting is 6 to 1 on English troops being back in Southern Ireland during the present year.

It so happens that the English Government is very wisely following the policy of allowing the Irish to stew in their own juice. Which is precisely the policy advocated in THE AEROPLANE some three years ago. But, if the *Express* is to be consistent, when the time comes for English troops to go and clear up the mess in Ireland we shall have a bitter wail from that paper because our soldiers are being sent to massacre the poor inoffensive Irish and collect taxes for whatever Government we choose to set up in Southern Ireland.

There the parallel ends, for luckily Ireland is separated from this country by a few miles of sea which prevent the crazy Iberian Irish from being a personal nuisance to the peace-loving Teutonic English. Consequently we can afford to sit tight and wait till the Irish have played at being Kilkenny Cats long enough for both sides to be glad of English intervention. In Iraq and Palestine the case is different, as may be seen by anybody with more intelligence than a London newspaper man, though curiously enough the same methods are necessary in dealing with the Arabs and the Irish because they are largely of the same species.

The people in Ireland who cause the trouble, that is to say the people who burn and rob and murder and run away, and the so-called Government troops who refuse to fight and refuse to obey their own officers and who "wear their side-arms awful and leave them all about," as Mr. Kipling said of "The 'Eathen in 'is Blindness" are the Iberian Irish and not the descendants of the old Norman settlers and the English and the Hannoverian planters, and unfortunately they are in the majority in the South. The Iberian Irishman is ethnologically *homo Mediterraniensis* and came from Spain in the days before Rome was. That is to say he is one with the low-class Spaniards, the Moors, Berbers, Syrians, and Arabs. A scientist will prove it by the shape of the brute's head but the ordinary man finds enough proof in the way the Southern Irish treat animals. The man who habitually drives a donkey with a knife-point or a sharpened stick, who habitually kicks his horses in the stomach, and who cuts off the tails of cattle or hamstrings them out of spite against their owner, is obviously of Mediterranean descent and not a Teuton. The German may commit atrocities on his equals but on the average he is kind to animals.

The Arab Question.

But the difference in the case of the Arab is that we cannot afford to let him go on kicking up a fuss, because we must have peace in Arabia if we are to build and operate our oil pipe-line from Basra to Jaffa. As explained in this paper many months ago the Air Force and the Navy will have to depend very largely and possibly altogether on Persian oil in the coming Race War, and that oil supply must be assured with absolute certainity. Consequently we cannot allow Kurdish and Arab tribes in the Mosul district to harbour Turkish and Bolshevik agitators who are endeavouring to stir up these tribes to interfere with our territory. And we cannot allow the Arab tribes in the desert between the Jordan and Iraq to fight among themselves and raid the peaceful tribes under Feisul to the East and Abdullah to the West.

If we left such tribes to their own devices we should have the Kurds and the hill Arabs looting Baghdad and Mosul and we should have the desert tribes looting Palestine. The Turks kept them in order after their own fashion when they governed or misgoverned Arabia and that fashion was far more drastic than ours. We can no more let those tribes have a free hand than we can leave the Pathans free to loot Peshawur and Lahore, as they would do inside three months if we left India to the Indians in the same way that we have left Ireland to the Irish.

The *Times*, which under its changed proprietorship has recovered the exalted tone on which its world-wide repute was based in the great days of Delane and his predecessors, has adopted the highly moral attitude that England accepted from the League of Nations the mandate to supervise the reconstruction of the Arab State and that having signed a treaty with Feisul we cannot get out of Iraq without disgracing ourselves, smirching our 'scutcheons, growing spots on our reputation and so forth. One wishes with all one's heart that such an argument carried weight with the politicians who in these days pose as statesmen. Unfortunately we are to-day more than ever a nation of shopkeepers, and therefore oil is probably of greater importance than honour.

For the matter of that honourable statesmen in any nation have always been the outstanding exceptions. There has never been a treaty which has not been broken when it was expedient to break it, and no international agreement has ever been more than a scrap of paper when the interests of the signatories have clashed. The most elaborate conferences and conversations with all their guarantees and

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sanctions and safeguards amount to no more than one child saying to another "Pax, I've got my fingers crossed."

National and international interests are the only guarantees of the keeping of treaties. And it so happens that our interests are in favour of keeping our treaty with Feisul. He and his brother Abdullah want peace in their territories so that they can collect their taxes. We want peace in their territories so that we may build and work our oil-pipes. We do not want their taxes and we do not collect their taxes. But we do want our perfectly good oil. And we mean to get it in spite of the *Daily Express* and the *Daily Mail*.

If in consequence of the enforcement of the *Pax Britannica* Messrs. Feisul, Abdullah and Co. get their taxes, so much the better, for the proceeds will enable them to equip and maintain quite a decent Arab Army which will provide jobs for axed British officers and for "Sergeant What's his Name." And that army according to experienced friends in Iraq can be made better even than the Egyptian army was when the fellaheen infantry of the Fayum under Macdonald, Maxwell, Lewis and Collinson and their cavalry and camelry under Broadwood faced and smashed the Khalifa's dreaded Baggara at Omdurman.

The Arabs were a fighting race a few hundreds of years ago. The Egyptians have not been fighters for over 2,000 years. And the Arab is better material when properly drilled and led. With an Arab Army to hold Mosul and Baghdad backed by an adequate Air Force supplied by us the peace of internal Arabia and the safety of our oil supplies are assured.

The Present Position.

The present excellent state of affairs in Mosul is well shown by the *Times* in an obviously well-informed article sent from Baghdad on February 12th. The following extracts are of particular interest :—

"'Like Aldershot during the autumn manœuvres, except that there is much less excitement,' was the description applied to Mosul by an officer of the Royal Air Force who has just returned from Iraq's northern city. The advent of British troops has had a most reassuring effect, and a feeling of security is now general throughout the vilayet.

"It is safe to assert that the expenditure incurred so far on the precautionary disposition of the troops is negligible, while there is every indication that Air Vice-Marshal Sir John Salmond and his staff are restricting expenditure to the narrowest limits, in marked contradistinction to the methods of the former military *régime*.

"Col.-Comdt. Dobbin, recently paraded all the troops in Mosul, and the subsequent march through the city produced an excellent moral effect. The Emir Zaid, brother of King Feisal, presented colours to the Second Cavalry and the Third Infantry Battalion of the Iraq Army, the ceremony being largely attended by the local population.

"Both Mosul and Baghdad are somewhat perturbed by Lord Curzon's reported acceptance of the Turkish proposal to postpone for one year the inquiry by the League of Nations into the political and ethnographical conditions of the Mosul vilayet. It is pointed out that the Turks are already conducting an intensive campaign of propaganda in Iraq, and that their agents would be certain to make the best use of the opportunities afforded them by a year's delay."

Furthermore Iraq is a very good training ground for the Air Force. Bad as is the climate it seems to be quite bearable, judging by the healthy specimens who come home. Sand-fly fever is not so bad as Malaria, it seems. There is the compensating advantage that as flying-country it is nothing like so bad as the North-West Frontier of India.

What Is Behind It?

Meantime one would give a great deal to know what is behind all this Get-out-of-Iraq agitation. Of course the papers which are running the agitation are quite honest and well-meaning But newspaper editors and even newspaper peer-proprietors are very easily misled. As a rule they are good business men but have a very limited grasp of World-politics and still less of the bigger strategy. In one's own little way one has worked up pro or anti agitations on fairly important subjects merely by filling up the right men with facts with which to bombard officials. Members of Parliament are still easier to use, for they are always glad of stones to throw at their opposite party and they particularly like technical or specialised information because it earns them a reputation for having encyclopædic knowledge

Can it be that the Anglo-Persian oil people are not popular in some political quarters, or that oil interests which are hostile to the Anglo-Persian are working up an anti-Arab campaign in the hopes of smashing the Persian oil interests. The big money which lies behind the big oil interests could quite easily work such an agitation without even the cutest of newspaper people or politicians knowing what was going on behind the scenes.

One has no idea who are the big men in Anglo-Persian oil. At one time, one believes, Persian oil was heavily backed by Admiralty money for there happened to be somebody at the Admiralty with enough intelligence to see that the Navy will need Persian oil in the next war. Even though we have big supplies of our own in Trinidad they may be cut off by enemy action. We shall certainly get none from the East Indies or the Caucasus or Galicia, for Japan will have one and the Bolsheviks the others. And America may need all her own and the Mexican oil.

Whether that Admiralty money is still in Persian oil or whether is was ever in the Anglo-Persian Oil Company as such one does not know. But certainly the importance of Persian oil was then recognised. And to-day it ought to be still easier to see its importance, when the Bolsheviks are openly boasting that they have the biggest army in the world.

Therefore are we to get out of Iraq and trans-Jordania, let them revert to Bolshevism and chaos, leave the road to our oil supplies open for a small enemy force to destroy them, and allow predatory tribes to hamper the construction and working of our pipe-lines, all because a few newspapers and M.P.s are so misguided or ignorant as to fail to see how far the safety of the Empire depends on our holding Iraq, trans-Jordania and Palestine? Certainly not, for in this matter our material interests agree with keeping our word to our Allies and with keeping our undertaking to the League of Nations.—C. G. G.

ON OUR AMERICAN VISITORS.

At the present moment the Aircraft Industry is much interested in the visit of sundry officers and officials from our late Allies, the United States of America. These gentlemen have arrived as a Commission for the adjustment of claims by British Aircraft constructors and inventors for compensation for the use of their designs and patents by the United States during the War and since.

The unfortunate fact that no American squadron mounted on American-built aeroplanes ever crossed the lines in anger does not appear to affect the question. Doubtless the impartiality of the American adjudicators will be considerably aided by the fact that so far as concerns the use during the war of British designs and inventions in America the amount awarded will be extracted by the British Government from the pockets of the British taxpayer, though as regards the use of the said designs and inventions in America since the War the money will be paid by America

Seeing that vast numbers of Bristol "Fighters," 0/400 Handley Pages and D.H.4s and 9 were ordered to be built in America and that the full working drawings of the 504K. Avro and sundry other machines were delivered to the U.S. Authorities one imagines that fairly large sums will be involved.

For example according to American official documents over 9,000 De Havillands had been ordered up to the date of the Armistice and over 4,000 of these were actually delivered. And since the War almost all the big flights in America have been done on D.Hs. modified as to tankage or seating accommodation or freight capacity but aerodynamically and structurally pure De Havillands. Thus the two big flights between Pacific and Atlantic one within 24 hrs. flying time and one within 24 hrs. "all-in" time were done of D.Hs. The great formation flight of four machines from Washington to Alaska and back was done on D.Hs. And nearly all of the something like 2,000,000 miles flown by the U.S. Postal Service in the past year has been done on D.Hs.—definitely declared to have been built during the War though used since the War, which makes a pretty point to decide whether John Bull or Uncle Sam shall put his hand in his pocket.

It appears that the situation was explained by our new Air Minister Sir Samuel Hoare at a lunch given to the American Commission at Claridge's one day last week by the Department of Government Hospitality, the head of which is apparently that Sir John Baird who at one time mishandled the affairs of the Air Force in the House of Commons. Which may or may not account for the fact that although the Aircraft Industry is more closely interested in the matter than is any other section of the community no report of the proceedings was issued to the aeronautical press or for that matter to any other section of the press.

Happily our old friend Major C. C. Turner of the *Daily Telegraph* and *Observer* was invited to the function in a purely private capacity and thanks to his journalistic ability one is able to give the following particulars, which are taken with thanks and full acknowledgments from the *Telegraph* of Feb. 14th :—

"When the United States entered the war all the available experience and information with regard to aircraft then at the disposal of the British Government was handed over freely to our new Ally under what is known as the Bolling Agreement. By this arrangement loss of time that would have been involved by the United States Government entering into negotiations with each inventor separately was

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avoided. . . . The Commission now sitting have not only to decide upon the amounts to be paid, but have also to determine whether the amounts are to be paid in one lump sum or in two. Payments will probably be separate, in which case it is expected that the United States will pay its share (that of the post-war period) to British manufacturers and inventors direct.

"Sir Samuel Hoare . . . expressed great satisfaction that throughout the negotiations there had not been the slightest hitch or the shadow of misunderstanding, and he referred gratefully to the services rendered by the chairman of the Commission, Lieut.-Col. Jos. I. McMullon, and by the Hon. Harry E. Knight, Assistant to the Attorney-General of the United States (both of whom were present). Colonel Wainwright, Assistant Secretary for War (Washington), was, by the way, largely responsible for the negotiations leading up to the visit of the Commission.

"There were also present at the luncheon Cmdr. H. C. Richardson, U.S.N., Mr. Post Wheeler, Capt. Charles Hussey, U.S.N., the Duke of Sutherland, Air Chief Marshal Sir Hugh Trenchard, Air Vice-Marshal Sir G. M. Salmond, Air Com. D. le G. Pitcher, Maj. Sir John Baird, M.P., Maj.-Gen. Sir W. S. Brancker, Brig.-Gen. R. K. Bagnall Wild, Sir W. Joynson-Hicks, Bt., M.P., Sir John Henry, Sir Gerald Chadwyck-Healey, Bart., Mr. R. H. Young, Sir G. L. Barstow, Maj. D. H. Gillette, Sir Walter F. Nicholson, Mr. P. Tindal Robertson, Mr. H. W. W. McAnally, C.B., Mr. E. E. Beare, Lieut. Boineau, Mr. C. R. Fairey and Maj. C. C. Turner.

"Lieut.-Col. McMullon has achieved great distinction in the field and in the Law. He served . . . during the war with Spain and in the Philippine insurrection. He took up the study of Law, but was called up for service in 1916 with General Pershing in Mexico. In the Great War he served in the artillery in the American Expeditionary Force. After the armistice he was engaged in the settlement and turning over of property in France. He is Secretary of the United States Inter-Departmental Patents Board and is in charge of the Central Patent Section, War Department.

"The Hon. Harry E. Knight, the legal member of the Commission, was born of English and Scotch parents. He studied at Georgetown University, Washington, and is a member of the Bar of the State of New York, the Supreme Court of the United States, and various Federal Courts. . . . He is the representative of the Department of Justice on the Inter-Departmental Radio Board, and is in charge of the defence of the United States in patent litigation."

ON AIRCRAFT TRADE IN THE BALTIC STATES.

Despite the poverty-stricken state of the British Aircraft Industry and the fact that the Air Ministry, although it gives away hundreds of thousands of pounds in Civil Aviation subsidies which are practically wasted, will do nothing to help actual sales of British aircraft there is no doubt that the British Aircraft Industry ought to make a definite attempt to capture the aircraft trade of the Baltic States. People in this country, except the people of Hull, Newcastle, Leith and our North-Eastern ports, are apt to look on the people of the Baltic States as a species of semi-civilised savage very similar to the Russian. It is quite time that this idea was exploded.

During the past few weeks one has been compiling the new edition of *All the World's Aircraft* and has been endeavouring to extract from the Embassies and Legations of foreign nations some account of the aeronautical progress in their various countries. Much to one's surprise one has found that the people of the Baltic States are very much more prompt and business-like in dealing with business letters than are those of countries which we are more apt to regard as business-like. This statement applies not only to the Legations but to the manner and method in which the people at their Headquarters at home have dealt with the requests from the Legations. Lithuanians, Latvians, Esthonians, Finns, Swedes, Norwegians and Danes have all sent in neatly-typed, plainly-stated documents accompanied by well-taken and properly-described photographs which have been promptly transmitted to this office from the Legations, while countries which consider themselves very much more important have either ignored requests for information or have dealt with them in a casual manner which leaves one in no doubt at all as to the organising ability and commercial capacity of the people concerned.

The difference is explained by the fact so frequently emphasised by Mr. E. J. Harrison in his recently-published and excellent book on Lithuania namely that the Baltic peoples are in fact purely Nordic and are very closely allied racially to the ancient Greeks and the Teutons, and are in no ways of Slavonic origin. They have been squeezed up to the shores of the Baltic by waves of Slav invasions but obviously have retained to a very great extent their racial purity and the Nordic habit of clear thinking. If they remain small nations it is because they are outnumbered but not outclassed.

People who deal with the Baltic nations habitually have a very great respect for their businesslike ways and commercial capacity. Their various rates of exchange show that they are very well worth cultivating from a business point of view. That being so it is fairly obvious that if no individual firm in the British Aircraft Industry can afford to exhibit at the forthcoming Gothenburg Exhibition some sort of co-operative effort should certainly be made to do so. If the British Industry can afford to guarantee all told a matter of about £3,000 for the International Congress in June, which is purely a time-wasting affair of words which cannot possibly bring in direct results, surely it is possible for it to subscribe two or three times that to make a display at Gothenburg.

If such a co-operative scheme should be arranged then one would strongly recommend that the exhibits should consist entirely of sea-going or amphibian aircraft and that when the exhibition is finished these aircraft should make a tour of the capitals of all the Baltic States so that not only the people from these who visit the Gothenburg Exhibition may be impressed but so that all the important Government and commercial people of the Baltic States may see that British aircraft are the best.

The French are so alive to the importance of the Gothenburg Show that the Aero Club of France has actually decided that French aviators may compete against Germans in the competition-flying at Gothenburg. And the French Aircraft Trade made up its mind long ago to exhibit French aeroplanes alongside German manufactures. If the bitter hatred of the French can thus be overcome by the calls of commerce then surely the inherent lethargy of the English business man can be likewise overcome.

Surely also it is part of the duty of the Department of Civil Aviation to take some active part in "showing the flag" at Gothenburg. The Department owns quite a number of aeroplanes. One is certain that it could beg enough petrol and oil from the Oil Trusts to take them to Gothenburg and back. And there are plenty of unemployed pilots who would fly the machines for the fun of the thing and chance making a little money somehow while there. Or if this were not approved they might be flown by R.A.F. pilots to whom special leave might be granted for the occasion.

Actually the R.A.F. as such ought to send a few flights of different types of machines to "show the flag" officially, as the Navy did at Rio last year. It was done inefficiently in 1920. Why not do it efficiently in 1923? In any case it is earnestly to be hoped that the Aircraft Industry and the Air Ministry will combine to keep up the reputation of British Aviation on this occasion.—C. G. G.

AN OFFICIAL VISIT.—At the Supermarine Works. Right to left, Mr. Hubert Scott-Paine, Air Vice-Marshal Vyvyan, the Duke of Sutherland, Brig.-Gen. Bagnall-Wild, Sqdn.-Commander Bird. Left alone, Sir W. Chilcott M.P. Left background, a Napier-engined Supermarine "Seagull."

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ON ANOTHER SCHNEIDER CUP MISTAKE.

The following announcement has been made by the Royal Aero Club :—

Schneider International Seaplane Race.—The Committee had before them proposals to hold the race at Eastbourne, Brighton, Weymouth, Cowes and Torquay.

After hearing the report from the Special Committee on the facilities available at each of these places it was unanimously decided to select Cowes, and to hold the race on Friday, September 28th, 1923.

Mr. S. E. Saunders of Cowes has kindly placed at the disposal of the Royal Aero Club, his Solent Works which provide ample accommodation for housing all the competing machines.

The course, although not finally settled, will include turning points at Cowes, Calshot and Southsea.

One had hopes that after the Bournemouth fiasco the Committee of the Royal Aero Club would at any rate have acquired enough experience, even if it would be too much to expect them to have acquired enough sense, to avoid Cowes as a base for any future seaplane events. Giving all credit to Mr. S. E. Saunders for his generosity and admitting the suitability of his premises, the fact remains that Cowes as a place is about as suitable for a base for the Schneider Cup Race as would be some out-of-the-way fishing village on the North-East or South-West coast.

There is a good road and good train service to Southampton, but the boat service to Cowes is infrequent and extremely inconvenient. It is impossible for busy people to get away from Cowes after the race and to get there it is necessary to fit one's time to the boat-schedule. We are not all, like the Committee and Secretary of the Royal Aero Club, able to beg or borrow private yachts and motor-boats.

Moreover Cowes is one of the most expensive and least comfortable seaside places in or near England so far as hotel accommodation is concerned. Even if one wants to avoid the piracy and discomfort of Cowes itself and wishes to stay elsewhere in the Isle of Wight, the cost of taking a car to the island is prohibitive and the island roads are absurd The turning points selected for the race are equally evi dence of the unfitness of the Royal Aero Club to handl a great international event. Calshot is a sand-spit mile from anywhere and can only be reached by the most primi tive of Forest roads. Southsea is the only place of the lo where the people of England can see the race. And even a Southsea the view towards Calshot is badly blanketed b Haslar and the point to the east of Stokes Bay, so tha unless people go and sit on Southsea Pier itself they wil see very little.

Also why was the end of September, the foggiest part o the Summer, selected for the date? And why a Friday whe the Saturday would have been so much more convenient fo most people? Is it that the Committee wanted to be sur of being back from their individual Summer holidays an being back did not want to interfere with their hard-earne week-end?

Furthermore, unless the rules have been altered, it is ope to question whether the Solent and Spithead can be classe as "Open Sea" in accord with the original specification.

Altogether it seems as if the Racing Committee of th Royal Aero Club has done its very efficient best to hold th Schneider Cup Race as secretly as possible and to assur another fiasco similar to that which occurred the last tim the Cup had the misfortune to fall into its hands. Which i curious, for taken individually the members of the said Com mittee appear to be quite intelligent people and are eve eminent in their own lines of business. Which seems t justify one's old theory that as soon as men with brain become members of an elective body they behave lik Members of Parliament, of whom W. S. Gilbert sang :—

"When in that House M.P.s divide, if they've a brain an cerebellum too,
They've got to leave that brain outside and vote just a their leaders tell 'em to."

So we can now settle down and prepare ourselves fo another international failure. It seems to be our fate t make ourselves ridiculous in aircraft sport.—C. G. G.

THE NEW CIVIL AVIATION SCHEME.

[The following précis of the Government's elaborate scheme for the salvation of Civil Aviation has been prepared by Captain W. H. Sayers, the Technical Editor of THE AEROPLANE, who is much better qualified to handle figures than one is oneself. It is proposed to deal with the general aspect of the affair next week after seeing or hearing from some of those concerned with Civil Aviation whose opinion is worth having. Meantime the scheme strikes one as being very like that put up by Mr. Holt Thomas and turned down by the Government some two or three years ago. Beyond submitting that the money would be very much better spent on equipping the R.A.F. with modern machines which are fit to fly one expresses no opinion on the matter for the present.—C. G. G.]

The report of the Committee appointed on Jan. 2nd by Sir Samuel Hoare, Bt., C.M.G., M.P., the Secretary of State for Air, to report upon the question of future subsidies for Civil Air Transport was issued to the public in the form of a white paper on Feb. 20th.

The unwonted celerity with which this Committee has carried out its task may probably be traced to two causes. One is the fact that the Committee consisted only of three members plus two secretaries, and the second that the three members apparently are really busy men and so can find time to attend to urgent business.

The Committee consisted of Sir Herbert Hambling, J.P. (Deputy Chairman, Barclay's Bank), Chairman, Sir Joseph Broadbank, J.P. (lately of the Port of London Authority), and Mr. O. J. G. Hoare (Manager, Cox & Co., Army Agents and Bankers) Mr. F. G. L. Bertram, C.B.E., acted as Secretary and Mr. D. H. Allan, C.A., as Financial Secretary.

The original terms of reference received by the Committee directed them "To consider the present working of the scheme of Cross-Channel Subsidies, and to advise on the best method of subsidising Cross-Channel Air Transport in future, on the assumption that H.M. Government would be prepared to continue to make provision for this service at the rate of £200,000 p.a. for a further term of years—say three years."

The Committee, after hearing evidence, came to the conclusion that the limitation to a period of three years implied in these terms would prevent the development of their conclusions to the best purpose, and they sought and obtained permission to remove from the terms of reference all limitations as to amounts and periods. The terms of reference on which the Report is presented are accordingly :—"To consider the present working of the scheme of Cross-Channel subsidies and to advise on the best method of subsidising Air Transport in future."

The report itself is divided into two sections, one dealing with the past and present schemes of subsidy and the second with proposals for the future. The Committee have no very high opinion of the past and present subsidy arrangements.

THE "TEMPORARY" SCHEME.

The first of these—known as the "temporary" scheme—was introduced on March 19th, 1921, after the British air-lines between London and Paris had closed down in the face of the heavily-subsidised French service. This scheme, which applied to the Handley Page and Instone lines, provided for a payment fortnightly on account of £75 per flight. The Air Council guaranteed a clear profit of 10 per cent. on gross receipts (other than payments on account by the Air Council) subject to a limit to the total liability of the Air Ministry of £88,200 for the period March 1921—March 1922, and further subject to the provision by the companies of a service approved by the Air Ministry.

The accounts of the companies for this period are still subject to final adjustment, but the general results are that the Air Ministry paid in subsidies £85,671, that the companies received as revenue other than subsidy £29,424, and expended £120,493. The loss on working was £91,069, and the loss to the companies after receipt of subsidies was £5,398.

THE NOT-TOO-PERMANENT SCHEME.

The second, or so-called "permanent scheme," provided for London-Paris services by the three companies (Handley Page, Instone and Daimler) and for the London-Brussels service by the Instone Company. The subsidy provided for the London-Paris service took the form of 25 per cent. on the gross earnings, plus £3 per passenger and 3d. per lb. of goods. In addition the Air Ministry was liable to provide 50 per cent. of the operating fleet on a hire-purchase system, and paid 50 per cent. of the insurance premiums.

For London-Brussels the conditions were similar with the exception that the grant per passenger was on a sliding scale varying with the number of passengers from £7 10s. per head for less than five to £2 15s. per head for eight or more.

The total liability of the Air Ministry was limited to £200,000 p.a. for all services.

The scheme was based on the estimate that the traffic of 1922 would be double that of the previous year. This proved far from the truth, and after a very short experience it was found that this scheme was financially unworkable, and in fact it was superseded by the "revised" scheme at the end of September. There was not enough traffic to keep three

(*Continued on page* 160.)

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

A note below draws attention to the somewhat voluminous technical publications issued by the American National Advisory Committee for Aeronautics.

The American Advisory Committee would appear to have a good deal more money available than has the corresponding body in England, and in consequence they have been able to carry out work particularly in regard to full scale experiment in a more ambitious manner than has been possible in England. Also there appears to be less delay in the publication of the results of the American experimental work, and there is to be found in these reports a good deal of information which is not to be found elsewhere.

(Moreover these reports are sent broadcast to all who wish for them, instead of being hidden modestly as are similar British publications, and so the prestige of American aeronautical scientists is greatly increased in foreign countries, to the ultimate benefit of the American Aircraft Industry.—Ed.) (No evidence of the superior modesty of the British Stationery Office is known to me.—T. Ed.)

A report of a lecture given to the Institution of Aeronautical Engineers, by Mr. W. L. Cowley, on the subject of the work of the N.P.L. Wind Tunnels will be found on a later page.

The most interesting point of the paper and the subsequent discussion is the evidence which it gives that the N.P.L. is thoroughly alive to the incomplete nature of its work on models, and is making every effort to bridge the gap which exists between model and full scale.

PUBLICATIONS OF THE AMERICAN ADVISORY COMMITTEE FOR AERONAUTICS.

The American Advisory Committee for Aeronautics which occupies in America a position very closely analogous to that of the British Aeronautical Research Committee publishes the results of its labours in two distinct forms.

What are known as Reports are printed on pages of about the size of those of THE AEROPLANE, bound in stout grey paper covers, and generally represent a fairly complete essay on the subject with which they deal.

There are also issued what are known as "Technical Notes." These are of the nature of interim reports on specific experiments and are produced in type-script by some form of manifolding machine. They are illustrated by manifolded curves and occasionally by actual photographs.

The Reports are published by the American Official Printing Office in Washington and may be purchased by the general public apparently at a uniform price of 10 cents per copy. The Technical Notes are apparently not for sale, but are issued to Aircraft Designers etc. of the U.S.A. and a certain number are distributed to the Technical Press both in America and abroad.

Both the Reports and the Technical Notes deserve to be better known in this country. It seems fairly obvious that the American Advisory Committee has a good deal more money available for the circulation of reports etc. than is the case with our own Research Committee, and they seem to be anxious to publish all possible information at the earliest possible moment—which is a characteristic not to be found on this side of the Atlantic.

THE WIDE RANGE OF THE REPORTS.

Another feature of great value is the fact that these publications are by no means confined to the result of exclusively American experiments. During the war there was naturally a fairly complete exchange of results as between the Technical bodies in America and in the Allied countries, and at first at any rate the American Committee had to rely largely on European laboratories for experimental results. As the American experimental organisation was developed there was an evident effort to co-ordinate American work with similar work abroad, and that very excellent effort still continues.

Since the peace the American Advisory Committee has continued to make the fullest possible use of such European work as it was aware of, and in particular they have given due attention to German research in aerodynamics. At least one of the most famous of German aerodynamicists has joined the staff of the American Advisory Committee and their publications not only contain full references to the work of Allied and ex-enemy laboratories, but they have translated and republished quite a number of foreign reports, for the use of American engineers.

From this it will be seen that these reports have a considerably wider scope than of the British R. & Ms. They are generally of a rather less severely academical nature than are the corresponding British reports, and confine themselves less strictly to a bare statement of observed facts.

GUESSING NOT EXCLUDED.

There is a readiness to hazard probable deductions from test results which is notably absent from the British equivalents. This may in some sense be regarded as a weakness—in that such deductions cannot be regarded as much more than intelligent guesses—and one gathers that the view of the British Aeronautical Research Committee is that guessing must be indulged in only as a strictly private amusement until the guess can be substantiated.

On the other hand such guesses can always be distinguished from records of fact, and guessing is a necessary part of the process of applying most experimental results, and the experimenter himself has some sort of claim to the right to guess first.

For the information of those who may be desirous of sampling these publications the following list of a batch of Reports and of Technical Notes is given.

The Reports may be obtained from the Government Printing Office, Washington, U.S.A., for the equivalent of 10 cents plus postage. For information as to the availability of the Technical Notes inquiry should be made of The American Advisory Committee for Aeronautics—Office of the Technical Assistant in Europe—5, Rue de Chaillot, Paris. In all probability the Reports also may be obtained from this address.

REPORTS.

No. 116.—Applications of Modern Hydrodynamics to Aeronautics. By Prof. L. Prandtl, Göttingen University. Report written by Prof. Prandtl for the Advisory Committee giving the outline of the Vortex Theory of aerofoils developed at Göttingen.

No. 125.—General Classification of Instruments and Problems, including Bibliography. An introduction to a series of detailed reports on aeronautical instruments.

No. 127.—Aircraft Speed Instruments. Detailed report on practically all known types of air-speed indicators.

No. 129.—Power Plant Instruments. Report on various types of rev.-counters, thermometers, pressure gauges and petrol gauges and flowmeters.

No. 132.—Oxygen Instruments. Report on aircraft oxygen apparatus of various designs.

Report No. 131.—Aerial Navigation Instruments. Covers compasses, turn indicators, air-speed indicators, drift indicators, and instruments used for astronomical observations, and the methods of using directional wireless.

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Report No. 145.—Internal Stresses in Laminated Construction. Report by officials of the Forest Products Laboratory on the stresses set up in laminated wooden structures by variation in shrinkage rate of the components.

Report No. 150.—Pressure Distribution over Thick Aerofoils. Result of model tests on various wings suitable for cantilever wing construction. Provides data for the estimation of load distribution on thick wings, of both parallel and tapered section.

Report No. 152.—Aerodynamic Properties of Thick Aerofoils—II. Model tests on a family of thick aerofoils, giving lift, drag and C.P. coefficients.

Report No. 154.—A Study of Taking Off and Landing an Airplane. An extension of the paper read before the Royal Aeronautical Society by S/Ldr. R. M. Hill. The manœuvres of landing and taking off were carried out on an aeroplane equipped with a recording air-speed indicator, recording accelerometer and a control position recorder. Curves show the loads on the machine, and the control movements actually used for various types of landing and take off.

Report No. 153.—Controllability and Maneuvrability of Airplanes. Tests made with a recording air-speed indicator, a control position indicator, an accelerometer and a recording angular velocity indicator. Records show the moments and forces and turning rates produced by given control movements.

Report No. 155.—A Study of Airplane Manœuvres with Reference to Angular Velocities. Tests with similar instruments to those used for Report 153, with a view to discovering the maximum angular velocity and acceleration reached in certain manœuvres.

Technical Notes.

No. 112.—The N.A.C.A. Three component accelerometer. Description of a new instrument.

No. 115.—The Effect of Longitudinal Moment of Inertia on Dynamic Stability. Report of test on S.E.5a to determine change in longitudinal stability in normal condition and with a 150-lb. weight moved to the nose and balanced by a 47-lb. weight at the tail. The moment of inertia was thus increased about 14%. The effect on stability was negligible.

No. 116.—Comparative performance of F.5 L. seaplane with geared and ungeared engines.

No. 118.—F.5 L. Seaplane. Performance characteristics.

No. 119.—The Elimination of Dead Centre in Controls of Airplanes with Thick Sections. Deals with the "dead" range of elevators following a thick tail plane and describes a method of overcoming this difficulty.

No. 120.—A Preliminary Study of Airplane Performance. Compares performance of four aeroplanes of practically equal power, weight and wing loading and with the same engine—one of which has a speed always 20 to 25 m.p.h. greater than the other three at equal engine r.p.m. Conclusion that the better body form of the high-speed machine is the sole reason for the difference.

THE WORK OF THE N.P.L. WIND TUNNELS.

On Friday, Jan. 26th, Mr. W. L. Cowley of the Aerodynamics Department of the N.P.L. read a paper before the Institution of Aeronautical Engineers on the Wind Tunnel Work of the National Physical Laboratory. Owing to the fact that the work carried on in the aerodynamic laboratory at the N.P.L. is almost entirely paid for by the Air Ministry, and is confidential until the Air Ministry sanctions publication, it was impossible for Mr. Cowley to give any information as to recent researches which are not otherwise accessible to the public generally in the form of Reports and Memoranda issued by the Aeronautical Research Committee.

The lecture was therefore confined very largely to a description of the wind tunnels and measuring apparatus developed at the N.P.L. The work of the N.P.L. in this department has a well-deserved reputation for accuracy and in view of the very great delicacy and difficulty of many of the measurements which are necessary, this description of the many ingenious appliances used was of very great interest.

Testing Large Models with Airscrews.

In a general manner Mr. Cowley touched on the nature of the investigations now going forward. The vexed question of scale correction—and other matters influencing the relation between model tests and full-size performance—are now studied by the use of the increased scope afforded by the new 7-ft. by 14-ft. duplex wind tunnel. This tunnel is large enough to test a one-fifth scale Bristol Fighter at 110 ft. per sec. (83 m.p.h.) and an electric motor sufficiently compact to be included in this model and sufficiently powerful to drive a scale model airscrew at its correct speed has now been constructed. Tests are therefore possible on the effects of airscrew slip stream on the performance of a model and there is no doubt that much useful information will be obtained from such tests.

The International Trials.

A model aerofoil has been tested in all the N.P.L. tunnels and at the R.A.E. and has been despatched to foreign laboratories for comparative tests in order to provide a basis of comparison as between various laboratories. An airship model is being subjected to a similar process. Mr. Cowley suggested that in 20 years or so these models may have completed their tour of the world.

Prandtl's theory of aerofoils—which gives certain remarkably accurate results—is being investigated. It is found that this theory enables the performance of tapered wings of varying section to be calculated from the known performance of various of the sections.

Control at Stalling Speed.

Work on aileron controls directed to the solution of control at angles of incidence above stalling is in progress. This has meant the investigation of the behaviour of aerofoils at angles between 15° and 40°—a range hitherto largely neglected. This work has also a bearing on stability and the conditions which lead to spinning—and in its development lies probably the only hope of producing aircraft which will not spin.

In conclusion Mr. Cowley referred to the value of wind tunnel work. The N.P.L. had been criticised by engineers for failing to give them figures which could be used with certainty for full-size design. There were admitted divergences between model and full-scale—but in many cases the model figures were a satisfactory guide to full-size work. A complete reconciliation between model and full-size could only be obtained by the development of a satisfactory general theory, and the wind-tunnel method of experiment was the best for obtaining accurate data on which to develop and check such a theory—for the difficulties of really accurate measurement at full scale were very great.

The development of such a theory was retarded by the fact that experiments intended to further practical design were given a high priority by the Air Ministry and general research work had to give precedence to such work. He did not think there could be any real question that the N.P.L. work had been of great practical value in the past, and he had no doubt that it would eventually lead to a satisfactory understanding of the laws of aerodynamics.

The Discussion.

In the discussion Major O. T. Gnosspelius paid a tribute to the accuracy of measurement at the N.P.L. He had however some doubts as to the accuracy of the method. Very great care was taken to ensure the uniformity of flow in the wind tunnel. But he felt that the flow actually present was one of uniform turbulence and that the air in the tunnel was a sort of porridge. This might lead to results which were quite different from those encountered when a body was moved uniformly through still air. He was by no means satisfied as to the alleged scale effect—he thought it might be caused by the conditions in the wind tunnel as opposed to those in the open air.

Captain Sayers, referring to Major Gnosspelius' remarks as to the turbulence in wind tunnels, said that a recent American report attributed a difference in maximum lift of 8% when the same models were tested in different tunnels to a difference in turbulence between the two tunnels. The matter was referred to quite casually as though it were an accepted fact that differences of turbulence would account for such a discrepancy. He would like to know if there was any evidence in the possession of the N.P.L. which went to confirm this American assumption.

As one of those who had criticised the N.P.L. fairly strongly in the past he thought it right to remark that his criticism had been directed to the assumption—which had once been common—that model figures applied accurately to full-scale work and that there was no appeal from N.P.L. model tests. It was fairly generally admitted now that there was a wide gap between the two sets of conditions, and the aerodynamicists were giving their attention to bridging this gap—and were very much less inclined to be dogmatic about full-scale design.

He thought that the N.P.L. as a national institution ought to devote its energies entirely to research into aerodynamic theory in order to provide a sound theory and that experiment for the immediate purposes of design ought to be the work of the actual designing firms. Both theory and design would then progress more rapidly.

Mr. W. O. Manning said N.P.L. work was of very great value. Thanks to it one could design certain types of aircraft with a fair certainty that they would behave as they were expected to. But the anomalous behaviour of high-lift wings put the designer in rather a quandary if he desired to design thick-wing cantilever machines, and the solution of the scale-effect problem was of the first importance.

Mr. L. Howard Flanders said that as the effects of turbulence had been mentioned he would like to ask Mr. Cowley whether he thought there was any evidence showing that turbulence might be a source of energy in the case of soaring

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flight, and might thus account for the performance of some birds.

In reply Mr. Cowley said that he was agreeably surprised by the nature of the questions asked in discussion. He had no previous experience of lecturing but from his observations of discussions in other places he had been led to expect a considerably less intelligent discussion on a subject of this sort.

Major Gnosspelius and Capt. Sayers had referred to turbulence. He agreed that the air in a tunnel was turbulent and they had made tests to discover its effect. In the case of an airship model increasing the turbulence by putting a screen ahead of the model made a large difference—up to 20%—in the resistance. In the case of an ordinary aerofoil the difference was negligible. There was room for a difference of opinion, but personally he believed that for aerofoils turbulence had little effect, and that the " scale effect " was not due to changes in the air condition in the tunnel.

He had not seen the American report referred to by Capt. Sayers, but generally such reports were very vague as to airspeed of test etc., and he thought many American discrepancies would be explained if this information was available. He cordially wished that Capt. Sayers' desire—that the N.P.L. could devote itself to research work and leave design experiment to private enterprise—could be realised. Under present conditions experiments for design purposes were so numerous that they seriously hampered more fundamental research.

With regard to Mr. Flanders' question the N.P.L. had given a good deal of attention to soaring and the opinion generally was that soaring could be explained in terms of upcurrents. He did not think turbulence could be held accountable.

THE L.F.G. "PUTBUS."

The L.F.G. " Putbus " built by the Luft-Fahrzeug-Gesellschaft m.b.h., Stralsund to the designs of Herr Baatz is a small single-seater float monoplane seaplane developed primarily as a ship-aeroplane.

All the parts, with the exception of the front part of the fuselage containing the engine, petrol tank and engine controls, are constructed to pack into five sheet-steel cylinders. The first and second cylinders contain one float in each and part of the float struts, the third cylinder holds one wing, tail plane, and fin, the fourth, the second wing, elevator, rudder and airscrew, while the fifth contains the fuselage including controls and short-float struts. These cylinders are made of Siemens-Martin hard sheet steel, those for use on surface craft being made fairly light, whereas for use on submarines they are made strong enough to withstand an external pressure of six atmospheres. The " Putbus " is built entirely of duralumin. The fuselage is constructed in three sections. The nose portion which contains the engine, a 100-h.p. Oberursel, two petrol tanks, suitably isolated between fireproof bulkheads, and the instrument board, is the only unit that is not stowed in a cylinder it being either carried on deck of a surface ship or stowed in one of the diving tanks of a submarine.

All instruments are so arranged that no pipes or levers have to be disconnected when the aeroplane is dismantled.

The centre portion of the fuselage includes the pilot's seat and controls, while the third section carries the tail unit. The wings which are back-swept are constructed in such a way that they can be folded lengthways along both spars. The rudder, elevator and aileron controls do not require to be dismantled when the aircraft is taken to pieces. The stabilising and control surfaces are of large area. The floats are of typical German aspect and constructed entirely of duralumin. The " Putbus " can be dismantled and packed in the cylinders in fifteen minutes and can be assembled in half an hour.

AVIATION IN RUSSIA.

Up to this year the Russian Red Army possessed but an apology for an air force which consisted mainly of aged Caudron G.3s and Nieuport Scouts, remnants of the day when the Imperial Russian Government was supplied with aircraft by the French and British Governments.

Recently however numbers of Italian Ansaldo biplanes, both single and two-seaters, have been delivered to Russia by Italian pilots.

This fact coupled with the announcement that the Red Air Force consists of 70 squadrons shows that Soviet Russia is beginning to realise the importance of the air. This announcement may be premature as the equipment of 70 squadrons with machines, spares, replacements, and above all pilots, observers and mechanics cannot be accomplished by a country like Russia whose modern machines cannot total more than a hundred in number. Indeed it has been reported that certain squadrons possess but two or three machines that are capable of flying and nothing has been said as to whether these squadrons possess pilots who are capable of flying these machines. Thus the 12 squadrons stationed at Moscow numbered last summer only 28 efficient machines, while Smolensk had 18, St. Petersburg 14, Podosinsk 16, Rostoff 8 and Sebastopol 30.

The following is the disposition of the Red Air Force in Russia in Europe :—

Moscow : 3 observation squadrons, 9 bombing squadrons, 1 air park.

Smolensk : 4 observation squadrons, 1 air park.

Podosinsk : 4 observation squadrons, 1 bombing squadron, 1 air park.

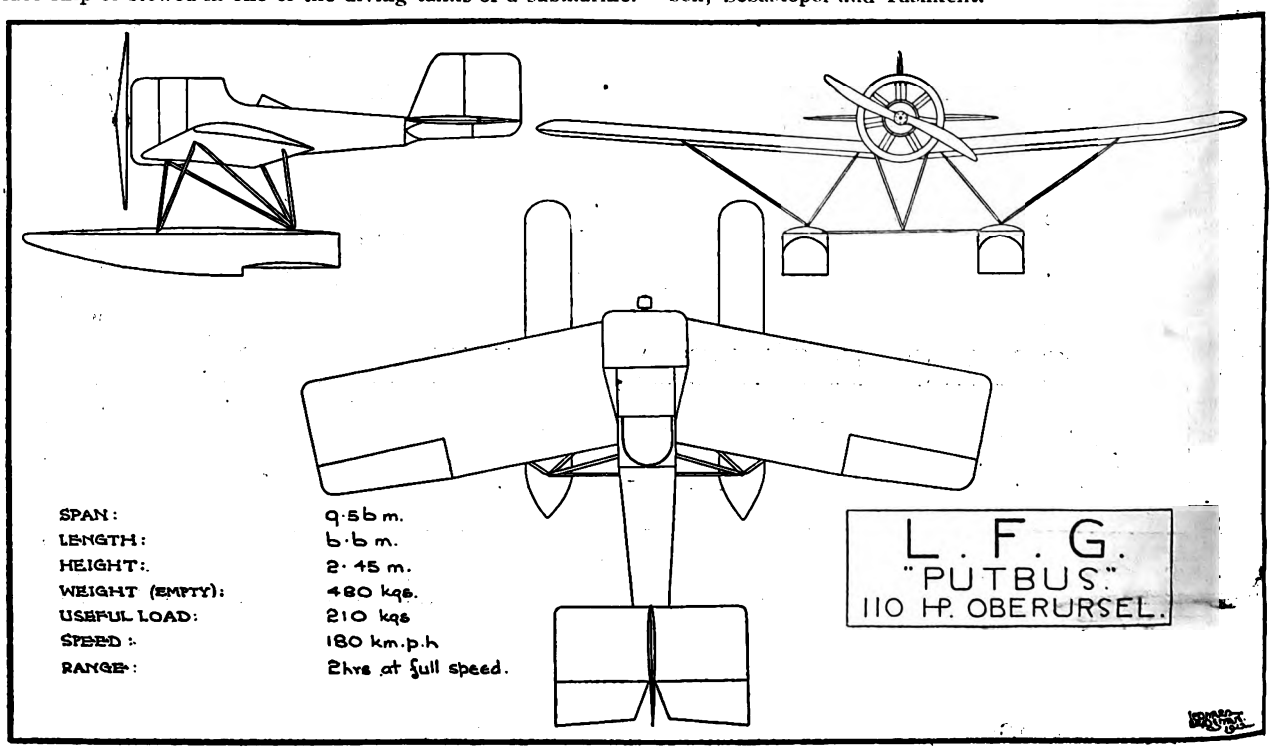
Petersburg : 4 seaplane squadrons, 2 bombing squadrons, 1 air park.

Rostoff : 2 seaplane squadrons, 1 bombing squadron, 1 air park.

Sebastopol : 5 observation squadrons, 3 bombing squadrons, 1 artillery spotting squadron, 1 air park.

Added to this are 31 observation and bombing squadrons stationed in the Ukraine and Russia-in-Asia stationed at Tamboff, Kieff, Kazan, Samara, Orloff, Omsk and Tashkent.

Aircraft repair depots are at Smolensk (two), Petersburg, Mosocw, Kazan, Samara, Orloff, Kieff, Rostoff, Omsk, Tamboff, Sebastopol and Tashkent.



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(*Continued from page* 152.)

companies alive and large compensatory payments—of a greater total amount than the subsidies earned—had to be paid to the companies.

THE "REVISED" SCHEME.

The revised scheme abolished competition between the companies, giving each their own route, provided a lump sum payment varying with the route mileage, subject to the performance of a minimum flight schedule and dropped the "hire-purchase" scheme which was found very difficult to work.

The material already supplied under it was handed over to the companies as a gift. The scheme provides for the new Supermarine Channel Service during one year, and it is estimated that the total liability of the Air Ministry between Oct. 1st, 1922, and March 31st, 1924, will amount to £304,000.

The Committee hold that both the original "temporary" and the present "revised" scheme suffer from the defect that each firm has a secured income subject to the maintenance of an agreed minimum service and that it offers no encouragement whatever to do anything beyond that minimum.

The "permanent" scheme succeeded in securing a large increase in the proportion of the total traffic carried by the British companies, but not an increase in the total sufficient to justify competition between three British lines.

The Committee remark however that this competition brought about the development of new theories as to the intensive use of aircraft (presumably aircraft here denotes G-EBBS.) that should have lasting results in reducing the overhead costs of air transport.

They sum up their criticism of all the schemes by remarking that none of them have had, or appear to be having, the effect of assisting civil aviation to "fly by itself," and they are not hopeful that any material change in this respect will have been effected when the present scheme expires on March 31st, 1924.

SOUND ARGUMENTS.

The Committee are impressed by the importance of the development of air transport on numerous grounds—economic, political and military—but they put as the essential object of their work the establishment of Civil Air Transport on a self-supporting basis.

They are convinced that the existing services are on too small a scale to be more than commercial experiments, and that new and longer routes must be developed before success can be obtained. They are convinced that "no effective spending of Government subsidies can be obtained unless the companies concerned are mainly risking . . . their own resources."

They recognise that neither the existing companies—nor any others—can be expected to risk the necessary capital for extensive development unless subsidies are provided, and their position in other respects secured, for a longer period than three years.

COMPETITION.

Believing strongly in the benefit of healthy competition in business, they do not conceive that in the present case any competition other than that of foreign air lines is necessary. They point out that while the Government is itself providing nearly two-thirds (⅔) of the whole revenue of the Air Lines in the form of subsidies, such competition is in effect the Government competing with itself..

They do not recommend that subsidies should be given either to the existing or to other independent operating companies, or to any amalgamation of the existing companies. This is on the ground that no comparatively small company can be in a position to expend from its own resources the capital necessary for research, experiment and development.

At the same time they recognise that the interests of the existing concerns must not be overlooked in any future proposals.

A NEW ORGANISATION.

They feel forced therefore to recommend the creation of a new organisation. This is to be not a corporation under Government control but a commercial concern with a privileged position. They consider that it is not possible to bring such a concern into existence on the security of any subsidy scheme lasting only three years and that provision must be made for some such period as ten years.

And they consider it an essential feature that the company should have such large resources of its own that in expending capital on experiment and development it will be primarily be risking its own capital.

They therefore make the following general recommendations:—

A company to be formed to have a capital of £1,000,000 (of which at least one-half should be subscribed before operations begin) and that the whole capital should be guaranteed before any subsidy is paid. The Government should have the right to nominate one or two directors.

The profits of the company should be devoted to:—

(i) The payment of a cumulative dividend of 10% p.a. on the ordinary shares

(ii) After payment of (i) any balance to be divided equally between the shareholders and the Government

(iii) When the Government under (ii) shall have received £1,000,000 (the proposed total amount of subsidy without interest) the Government interest in the company shall cease and the whole profits shall belong to the shareholders.

THE PROPOSED SUBSIDY.

The Government shall for its own part guarantee a subsidy, to be spread over 10 years (but not in equal annual instalments) of such an amount as will enable the necessary share capital to be raised. In the Committee's opinion the amount of subsidy so necessary will not be less than £1,000,000.

The Government shall not exercise any direct control over the activities of the company other than by the appointment of Directors, except for purposes of checking accounts to determine amounts of subsidy payable, and such general control as may be exercised by the Department of Civil Aviation over all civil flying.

No restrictions as to routes, types of machines, number of services, etc., should be necessary as it would be to the company's advantage to manage the business to the best commercial advantage at minimum cost and with the best possible equipment.

Provision for the right of the Government to take over all engines and plant in the event of war, and for the termination of the agreement in case of liquidation of the company, or cancellation under stated conditions should also be made.

The Committee point out that in the event of their proposals being adopted, many questions will remain for detailed and careful consideration.

They consider in particular that the services and facilities now provided free by the Government to the present companies should be continued—and possibly extended—to the new company. (This refers to such matters as the provision of aerodromes, marking and lighting of routes, wireless and meteorological services, etc.)

The Committee remark that they have been impressed by the fact that under the present and previous schemes no single official of the Air Ministry has been in a position to take a complete view of the administration and working of the subsidy schemes, and they therefore add a special recommendation that if their proposals are adopted a responsible official should be placed in charge of all the negotiations, both with any group who propose the establishment of the company, and with the company itself when it is established.

TECHNICAL COMMENT.

This report is among the most important pronouncements that have yet been made as to the development of Commercial Air Transport. None possessing the least knowledge of the present achievements of aircraft combined with any imagination whatever can doubt that real commercial air transport must come into existence at some time in the future. The only question is how soon can that occur?

The answer is that it will occur only when enough money has been intelligently spent on development work on a commercial scale, and therefore the first problem to be solved is how to raise the large sums which will inevitably be necessary.

The value of this report lies in the fact that it is the report of a committee with no special aeronautical associations but with a wide knowledge of large financial undertakings, and that it makes a definite proposal as to the method which in their opinion will best serve to secure capital for development work on a reasonably adequate scale. All the technical abilities of the aircraft industry can do little towards making aviation pay if the necessary capital cannot be raised. Given the capital, the technical people can get on with their work with the certainty of ultimate success.

The definite suggestion of the form in which a subsidy should be granted is interesting, and has very great merit. In effect it amounts to the suggestion that the Government should make to the company a loan of £1,000,000 distributed over a period of 10 years. This loan is repayable—without nominal interest it is true—but not without consideration which the Government presumably is ready to accept in lieu. For the successful building up of a sound Aircraft Industry and Air Transport business represents not only an added national asset but also a source of direct and indirect revenue for the Government.

The so-called subsidy ceases to be a subsidy under these conditions. It is not a gift but a loan which has to be paid back if permanent success is to be attained. And the company is in precisely the same position so far as incentives to efficient and economical management is concerned as if it were working entirely with its own capital.

And that being the case the general objection to subsidisation vanishes.—W. H. S.

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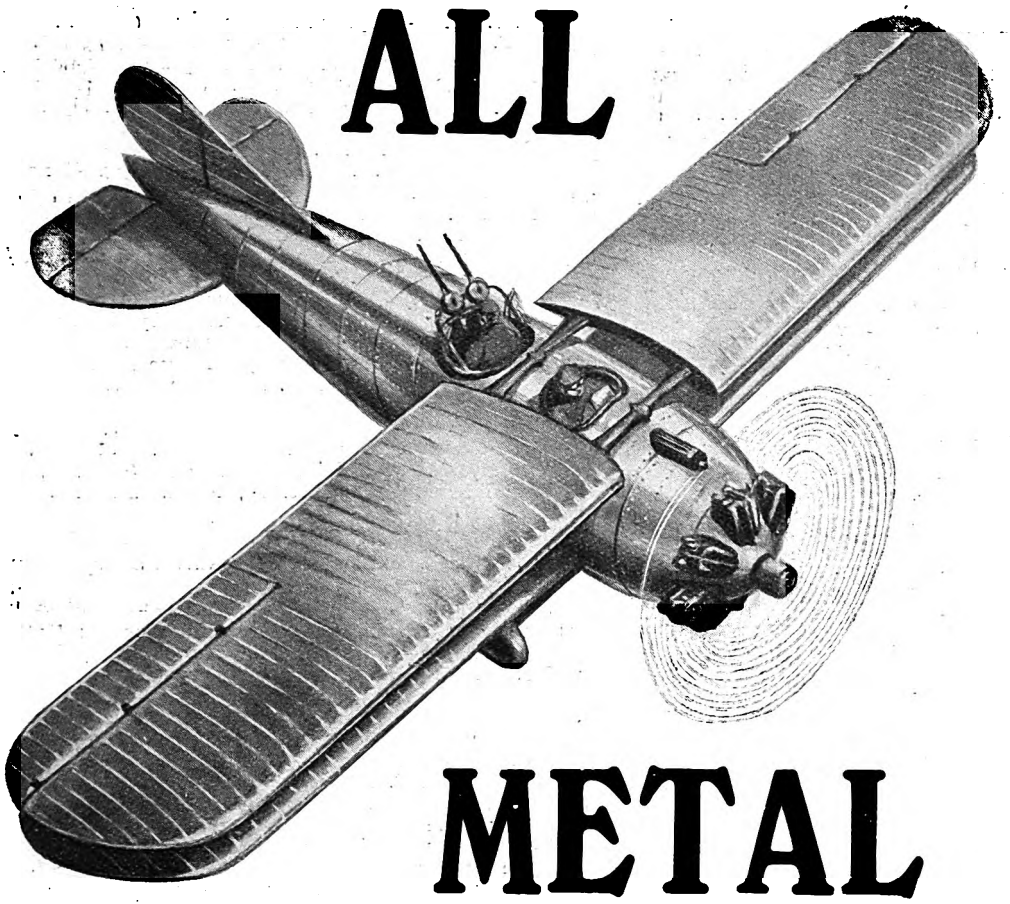

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R.A.F. INTELLIGENCE.

Appointments.

AIR MINISTRY, Feb. 21.

GENERAL DUTIES BRANCH.—Air/Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., from H.Q., R.A.F., Mediterranean, to R.A.F. Depot (Supernumerary), 2/2.

Wing/Commander J. T. Cull, D.S.O., from H.Q., C.A., to H.Q., R.A.F., Mediterranean, 23/1.

S/Ldrs. C. C. Miles, M.C., from Half-pay List to R.A.F. Base, Gosport, No. 3 Squadron, to command No. 3 Squadron, 15/2; J. T. Whittaker, M.C., from H.Q., No. 12 Wing, Ireland, to command No. 39 Squadron, 8/2; E. R. L. Corballis, D.S.O., from C.F.S. to command No. 24 Squadron, 12/2.

F/Lts. F. W. Walker, D.S.C., A.F.C., from Seaplane Training School to R.A.F. Base, Leuchars, No. 205 Squadron, 15/2; J. W. B. Grigson, D.S.O., D.F.C., from Seaplane Training School to R.A.F. Base, Leuchars, No. 205 Squadron, 15/2; H. K. Thorold, D.C., D.F.C., A.F.C., from No. 84 Squadron, Iraq Command, to No. 4 F.T.S., Middle East, 14/1; F. J. Vincent, from No. 1 Squadron, Iraq Command, to No. 4 F.T.S., Middle East, 14/1; A. J. Long, from M.T. Repair Depot to School of T.T. (Men), 26/2; H. S. P. Walmsley, M.C., D.F.C., from No. 55 Squadron, Iraq Command, to R.A.F. Depot (Supernumerary), 14/1.

MEDICAL BRANCH.—F/Lts. J. K. R. Landells, M.B., from H.Q., No. 12 Wing, Ireland, to No. 1 School of T.T. (Boys), Halton, 7/2; W. E. Hodgins, M.B., the entry concerning this officer dated 31/1 is hereby cancelled.

STORES LIST.—F/Lts. W. C. Clark, from H.Q., No. 12 Wing, Ireland, to R.A.F., Depot, 7/2; F. Petch, O.B.E., from I.A.A.D to No. 11 Wing Headquarters (Supernumerary), 26/2.

Major and Ordnance Officer (3rd Class) C. H. Saunders, C.M.G., R.A.O.C., to Ordnance Depot, Palestine Command, on attachment to R.A.F., for duty as Chief Ordnance Officer, 23/1.

A Royal Investiture.

H.M. the King held an investiture at Buckingham Palace on February 22nd. Grp/Capt. H.R.H. the Prince of Wales was present with the King.

Amongst those in attendance upon His Majesty was Air-Chief-Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., Principal Air Aide-de-Camp.

The following officers of the R.A.F. were introduced into the presence of the Sovereign, when the King invested them with the insignia of the respective divisions of the Orders into which they have been admitted:

The Most Honourable Order of the Bath. To be Companions:—Air/Comdre. Edward A. D. Masterman, C.B., C.M.G., C.B.E., A.F.C.; Grp/Capt. Ian Malcolm Bonham-Carter, C.B., O.B.E.

46 Squadron Dinner.

46 Squadron Annual Dinner is to be held on March 24th, at the Hotel Cecil, 6.45 for 7.30 p.m. Pompadour Room. Dinner jackets. Tickets 1 guinea inclusive of wine. Notification of all members desirous of taking part should be given as quickly as possible to Capt. C. J. Marchant, 10, Bush Lane, Cannon Street, E.C.4. Members are allowed each to bring one guest provided previous notice is given.

55 Squadron Dinner.

55 Squadron held its fifth annual dinner on Saturday Feb. 24, at Oddenino's. Some thirty members of the mess were present with W/Cmdr. Baldwin, D.S.O., O.B.E., in the chair supported (metaphorically only, *bien entendu*) by S/Ldrs. or ex-S/Ldrs. Nicholas, Silly, Gray and Rice. The occasion was particularly notable because for the first time in the history of R.A.F. squadron dinners serving members of the new war squadron joined with those of the old war squadron, some half-dozen officers, the senior being F/Lt. Maxwell, who were recently with 55 in Iraq being present.

W/Cmdr. Baldwin being under orders for overseas delegated the organisation of future gatherings to S/Ldr. Nicholas, who is now on home service, but promised to come to such dinners himself whenever humanly possible. A 55 Squadron Dinner Club was formed and all officers who have served with the Squadron are invited to communicate as soon as possible with S/Ldr. C. H. Nicholas, D.F.C., A.F.C., at the R.A.F. Experimental Establishment, Martlesham Heath, Suffolk.

Speeches were commendably brief and consisted chiefly in emphasising the fact that 55 was the best squadron that ever happened and in discussing its domestic affairs. Certain R.A.F. anthems were sung, including that concerning "Allouette," and the whole affair was just the sort of success which every famous squadron ought to organise and does not.

The R.A.F. Rugby Team.

(Unofficial.)

R.A.F. v. DEVONPORT SERVICES.—The R.A.F. played the United Services, Devonport, at Devonport on Feb. 22nd and beat them by two tries (6 points) to nil. The match was played on very soft ground and in a downpour of rain. From the start the R.A.F. pack were well together and breaking up quickly got in some fine rushes. Gilbert, the Services full-back, was kept hard at work right up to the end of the game. F/O. Adams scored just before half-time and F/Lt. Wakefield picked up and beating three of the Services' men, sprinted across. The place-kick failed on both occasions.

R.A.F. v. BATH.—Playing at Bath against Bath on Feb. 24th the R.A.F. were beaten by two tries (6 points) to nil. Bath is of course one of the strongest sides playing this year, and the fact that their seven-forwards formation more than held the R.A.F. pack should give the Air Force seriously to think at Aldershot on March 10th, judging by what one has already seen of the Army forwards.

The Bath and R.A.F. forwards were fairly well matched but the Air Force were outplayed behind the scrum, the handling of their centres being still shaky. Splendid footwork by the R.A.F. forwards frequently gained ground lost by the Bath passing movements. They failed to clear however and before half-time one of the Bath halves got away and although checked by Lowe, punted high and a try resulted. In the second half clean passing by the Bath backs gave the ball to Gibbs who scored again. Both tries were unconverted. On the whole the Air Force put up a good show and undoubtedly learned a lot at the trifling expense of six points.

The R.A.F. team were: L/AC. Runham; Cpl. Jones, F/Lts Riddle, Bryson and Lowe; F/Lt. White, S/Ldr. Russell; F/Lts. Wakefield, Usher and Simpson, F/O.s Adams and Rose, P/O. Coventry, F/Sjt. Smith and AC. Collins.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

R.A.F.—Mediterranean.

No. 267 SQUADRON, CALAFRANA, MALTA.—ASSOCIATION:—The results of a particularly successful month are: Royal Engineers (won 2—1, 2—0), H.M.S. *Marlborough* (won 3—2), R.A.S.C. (won 8—1), and Royal Artillery (drawn 1—1).

The results to the end of January were:—Played 22, won 10, lost 5, drawn 7. Goals for, 51; against, 40. Of the ten matches played at home, none have been lost.

Goals have been scored by:—AC. Price, 17; Cpl. Jones, 8; AC. Nicholls, 8; AC. Harris, 5; AC. Bray, 4; AC. Shepherd, 3; AC. Arnott, 3; Sgt. Vella, 2; AC. Howell, 1.

HOCKEY:—The first match during January against H.M.S. *Marlborough* was lost by 3 goals to 5, but in the remaining three the Squadron was successful, beating H.M.S. *King George V* (3—2), Eastern Telegraph Co. (1—0), and H.M.S. *Caradoc* (4—0).

The results table is—Played 12, won 6, lost 4, drawn 2. Goals for, 31; against, 26. The goal-scorers' list is easily headed by F/Lt. Elmhirst, 10; followed by F/Lt. Stewart, 6; F/O. Pennington, 4; Sjt. Southgate, 4; AC. Hill, 2; AC Howell, 2; Wing/Cmdr. Cull, 1; Cpl. Dunn, 1; AC. Yeo, 1.

Boxing.

The results of the Team Championship recently held at Margate, which were received too late for inclusion last week, were as follows:—

Team Placings:—Officers' Challenge Cup.—Andover (holders) 16, Uxbridge 15, Kenley and Manston 9.

Other Ranks.—Halton 32, Andover 32, Henlow 19, Uxbridge 17, Kenley and Manston 17, Isle of Grain 7. Halton won the Cup having won three events to Andover's two.

Individual Winners: Officers.—Fly, F/O. E. H. Attwood (Andover); Bantam, F/O. G. Birkett (Andover); Feather, F/O. J. G. Horn (Uxbridge); Light, F/O. Lugg (Uxbridge); Welter, P/O. C. E. N. Guest (Andover); Middle, F/O. A. J. Adams (Uxbridge); Light-Heavy, P/O. C. W. G. Scott (Kenley); Catch, F/O. W. B. Clarke (Andover).

Other Ranks.—Fly, AC. Lawler (Andover); Bantam, AC. Cox (Uxbridge); Feather, AC. Whittaker (Halton); Light, Sjt. Salter (Halton); Welter, AC. Bills (Halton); Middle, AC. Ballantyne (Andover); Light-Heavy, Cpl. Johnson (Kenley and Manston); Catch, AC. Hankinson (Uxbridge).

NOTE.—All R.A.F Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to THE AEROPLANE should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.

A HINT TO THE AIR MINISTRY.

The following passage from a letter written recently by a very competent engineer who has had much to do with the Air Ministry on the technical side will be found of interest:—

"What is extremely irritating is the hopeless failure of that side of the Air Ministry which deals with contractors financially and technically to function at all, or other than very feebly.

"Although the staff has been reduced the regulations have vastly increased and it takes months to get a decision on the simplest points. Correspondence is ignored and only the pin-pricks of personal agitation produce any signs of life. The staff shows the greatest goodwill but is quite incapable of dealing with its work.

"In consequence of these troubles the efficiency of an en-

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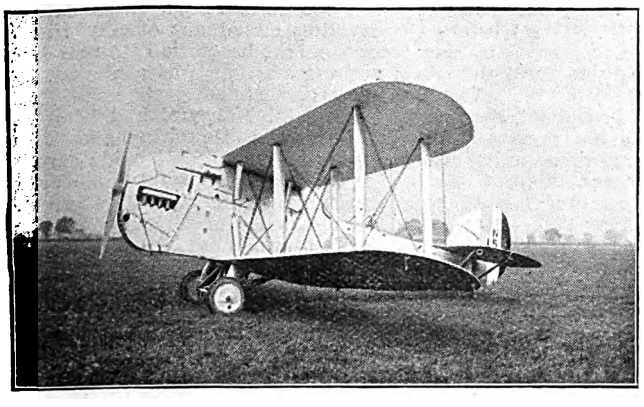

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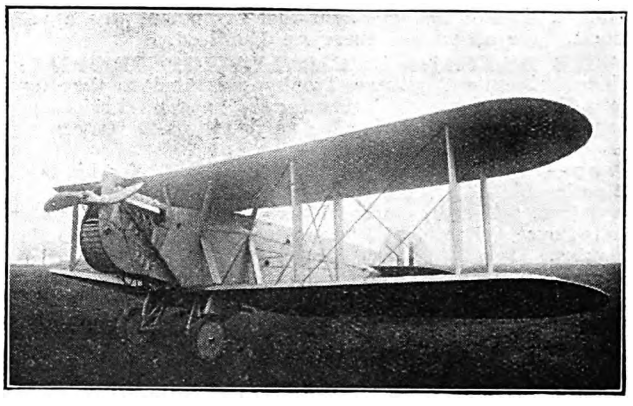

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gineering staff engaged on Government aircraft work is low and it is so easy to fall into the official groove.

"Considering the technical possibilities the present progress of aircraft design is miserable."

These sentences express a feeling which is growing to a regrettable extent among the most intelligent technical people in the Aircraft Industry. Though the officials at the top are very much in earnest and are doing their level best they are necessarily very much in the hands of their subordinates, many of whom are notoriously incompetent though naturally no contractor will say so to the chief of a department because unless the incompetent official be removed the contractor is at once open to reprisals.

One merely gives this hint to the heads of departments so that they may be on the alert to discover and dismiss the incompetents and may not be lulled into a false idea that all is well because the contractors themselves make no complaint. The Geddes Axe has in many cases been grossly misdirected.—C. G. G.

THE GUN-PIT CLAIM.

On February 21st the trustee in bankruptcy of Mr. Chessborough J. Mackenzie Kennedy, the author of the famous super-Sikorsky biplane which has so long decorated or disfigured (according to taste) the landscape at Northolt, sued the Air Council in respect of the rights to use the idea of a gun-pit in the tail of an aeroplane.

The Plaintiff alleged that the War Office agreed with one Hamilton Edwards to take an aeroplane designed by Mr. Kennedy, having a gun-pit in the tail and engines mounted on the wings. It was alleged that this was the first multi-engined aeroplane designed and constructed in Great Britain. One may remark that it was antedated by several in the years before the War and by two at least early in the War.

It was further alleged that in the Autumn of 1917 the Air Board lent their designing and technical staff to Handley Page Ltd., who disclosed to that firm Kennedy's confidential reports and that the Handley Page V 1500, which had a gun-pit in the tail, was the result. Mr. F. Handley Page applied for a patent for the tail gun-pit on March 15th, 1918, and Mr. Kennedy applied for a patent on March 16th.

The Plaintiff asked for a declaration that the Kennedy patent was valid, claimed £156,506 damages (one likes the exactitude of the £6) as the profit made by Handley Page Ltd. on the V 1500, and £171,000 royalties on the invention.

It was contended that the Air Council had taken over the rights and liabilities of the Directorate of Military Aeronautics, of the Admiralty Air Department and of the Air Board in virtue of Section 10 of the Air Forces (Constitution) Act, 1917, which reads, "The Air Council may sue and be sued, and may for all purposes be described by that name."

Mr. Justice Russell ruled that the Air Council being established to administer matters relating to the Air Force was in the fullest sense the Crown and that the remedy of a subject was by petition of right and that no action would lie. The intention of the section was to authorise the use of a name and not to confer new rights in derogation from the Crown's prerogative. So far as the action claimed relief for breach of contract and for the alleged infringement of Kennedy's patent it was not maintainable and the Plaintiff could not by action against this Government Department obtain a declaratory judgment that his patent was a valid patent. The action was therefore dismissed.

THE BRITANNIA CHALLENGE TROPHY.

The Britannia Challenge Trophy presented to the Royal Aero Club by Capt. H. Barber for the most meritorious performances in the air during the years 1919-20-22 respectively, has been awarded as follows :—

1919.—To the late Sir John Alcock, K.B.E., for his Cross-Atlantic Flight (St. John's, Newfoundland-Clifden, Co. Galway) June 14th-15th, 1919. Vickers-Vimy Biplane 2—350-h.p. Rolls-Royce "Eagle VIII" engines, 1,890 miles. 16 hrs. 12 mins.

1920.—To Bert Hinkler for his flight from Croydon to Turin, May 31st, 1920. Avro Baby Biplane, 35-h.p. Green engine. 650 miles. 9 hrs. 35 mins.

1922.—To F. P. Raynham for his glide at Firle Beacon, Sussex, Oct. 17th, 1922. Duration 1 hr. 53 mins. 2 secs.

PERSONAL NOTICES.

DEATHS.

CURTIS and EMBLETON.—On February 23rd, in the Mokattam Hills, near Cairo, as the result of a flying accident, Philip Frank Axford Curtis and Clifford Frederick Embleton, F/O.s, 216 Squadron.

MARRIAGES.

DUFFUS—COLLIE.—On February 6th, at St. Andrew's Presbyterian Church, Singapore, by the Rev. G. H. Douglas, Alan A. Duffus, M.B., Ch.B. (late R.A.F and R.F.C.), Municipal Health Department, Singapore, to Margaret Leila, daughter of James Younger Collie, Advocate in Aberdeen.

ROBINSON—THRELFALL.—On February 17th, at Herne Hill Wesleyan Church, George Leonard Robinson, D.S.O., Chaplain R.A.F., to Carolyn, widow of Colin S. Threlfall, and youngest daughter of the late Thomas Tunnicliff, of Manchester.

CERTIFICATES OF PERFORMANCE.

The following Certificates of Performance have been granted to the Gloucestershire Aircraft Co., Ltd. by the Royal Aero Club :—

(A) Type.—Gloucestershire Mars I ("Bamel"). Constructor. — Gloucestershire Aircraft Co. Ltd., Cheltenham. Engine.—Napier "Lion." Pilot.—J. H. James. Place.—Villesauvage, near Etampes. Date.—Oct. 4th, 1922. GREATEST SPEED OVER A STRAIGHT-LINE COURSE OF ONE KILOMETRE —341.423 kilometres per hour = 212.15 miles per hour (being the mean speed of two double flights in accordance with the Regulations of the F.Aé.I.).

(B) Type.—Gloucestershire Mars I ("Bamel"). Constructor.—Gloucestershire Aircraft Co. Ltd., Cheltenham. Engine.—Napier "Lion." Pilot.—H. A. de H. Haig. Place.—Martlesham Heath, Suffolk. Date.—Nov. 23rd, 1922. CLIMBING PERFORMANCE.—5,000 ft. in 1 m. 51 sec. (= 2,390 ft. per min) 10,000 ft. in 4 m. 15 sec. (= 1,855 ft. per min.). 15,000 ft. in 7 m. 25 sec. (= 1,325 ft. per min.). 19,500 ft. in 11 m. 34 sec. (= 845 ft. per min.).

QUAINT COMPETITION RESULTS.

The military competition organised by the Spanish Army Air Service has just closed, and three French aeroplanes took the first three prizes in the Reconnaissance class. The Breguet 19 A2 "Sesquiplan" piloted by M. Thierry apparently put up so good a performance that it was placed well ahead of the second machine, a Farman "Goliath" of the standard military type piloted by M. Coupet. The third machine was a Farman "Goliath" fitted with 2—375-h.p. Lorraine-Diétrich engines, also piloted by M. Coupet.

In the class for Fighting Scouts the Nieuport-Delage 29 came out on top, the Dornier and Fokker machines being eliminated with wing trouble.

Only one machine, the Farman "Goliath," was entered for the Big Bomber class.

Among the various firms, other than French, who competed were Zeppelin, Dornier, Albatros, Fokker, Ansaldo, Bristol and the Aircraft Disposal Co.

It is hoped later to obtain further particulars of this so-called "competition" as it is obvious from the published results that either the conditions were ludicrous or that the whole thing had been decided beforehand and the competition was held to give an air of artistic verisimilitude to an affair which had been previously arranged.

GLIDING-TIME.

BISKRA.

The Biskra meeting definitely closed on Feb. 20th. On Feb. 11th Lieut Thoret flew on the Hanriot H.D.14 with his airscrew stationary and Adjt. Descamps made a flight of 2 hrs. 2 mins. 35 secs. in a Dewoitine monoplane. M. Barbot made a short flight of a few minutes' duration on a Dewoitine monoplane to be used by M. Fronval.

Lieut. Le Petit took off on a Peyret tandem monoplane but was blown over, both pilot and machine being damaged. After his accident only two whole machines were left at Biskra.

Since his arrival at Biskra, Adjt. Descamps had put up a total of 20 hrs. 4 mins. flying time. The greatest height reached during the meeting was made by Adjt. Descamps who on a Dewoitine got up to 630 m. or roughly 2,000 ft.

A few days before the meeting closed an official time-keeper arrived so that records might be officially timed but owing to the light winds nothing startling was achieved.

VAUVILLE NEAR CHERBOURG.

Throughout the Biskra meeting M. Maneyrol had been at Vauville preparing for the Levasseur, Dewoitine and Tito Landi prizes, all of which are for distance flights made across country. On Feb. 8th in a 15-18 m. per sec. wind he covered a distance of 2.875 km. remaining in the air for 7 mins. and on Feb. 26th he covered a distance of 10 km. For the Levasseur Prize a minimum of 10 km. must be covered and as the closing date for the competition was Feb. 28th it would appear that Maneyrol has won that prize of 5,000 francs.

This result is not very convincing as it is not known whether the flight was made along a ridge or over flat country. In any case flights of three and four miles were made by various pilots during the Itford meeting from one end of the ridge to the other. M. Bossoutrot is due at Vauville with a new-type Farman glider during this week.

BRUSSELS.

Lieut. Simonet on a Poncelet monoplane glider made by the S.A. Belge de Constructions Aéronautiques made flights of 80, 110 and 150 metres over Brussels Aerodrome on Feb. 10th, and the machine's controls were also tested on the following day in a flat calm by being towed behind a car, a flight being made thus of about 900 m. distance. He will make further flights in the Ardennes now that he has satisfied himself that the machine is controllable. The aviation school at Gosselies are constructing a glider to the designs of a Russian engineer named M. Florinne.

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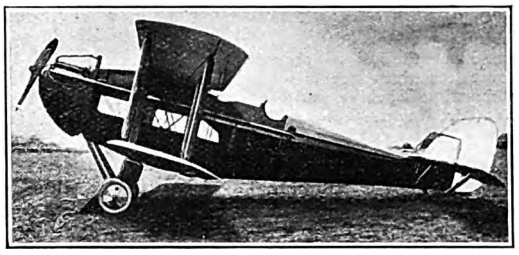

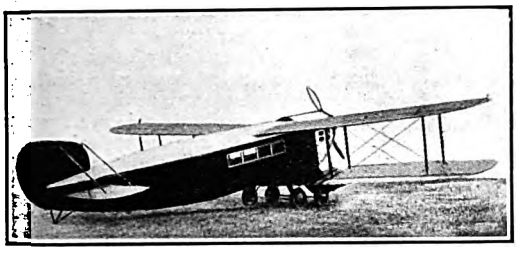

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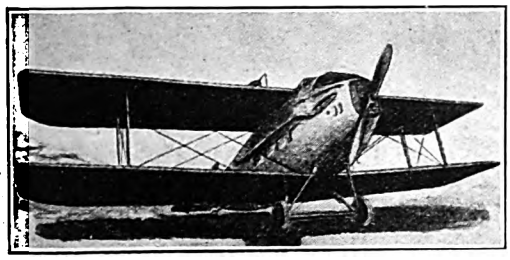

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Feb. 11th :—

LONDON—PARIS :

Handley Page Transport, Ltd., machines 8*, passengers 59, De Havilland Aircraft Company (Night and Special Service), machines 2, passengers 2; Air Union, machines 9†, passengers 10; Total machines, 19, passengers 71.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 8, passengers 23.

MANCHESTER—BIRMINGHAM—LONDON—AMSTERDAM :

Daimler Airway, machines 9, passengers, Manchester-Birmingham-London, 3, London-Amsterdam, 3.

LONDON—ROTTERDAM :

K.L.M., machines 6, passengers 2.

Total number of trips: British machines 27, carrying 90 pas., Foreign machines 15, carrying 12 pas.

Trips per day.—Monday, 0; Tuesday, 4; Wednesday, 3; Thursday, 12; Friday, 12; Saturday, 10; Sunday, 1.

STATISTICS.

Machines, 42; Passengers, 102; Crews, 76; Total Personnel, 178.

Corresponding week last year :—

Machines, 45; Passengers, 81; Crews, 74; Total Personnel, 155.

Corresponding week, 1921 :—

Machines, 30; Passengers, 32; Crews, 38; Total Personnel, 70.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

Though they have not done much flying this week, the Aircraft Disposal Company have been quite busy in the shops. The mystery monoplane to which one alluded in these notes some time ago has now been erected but the engine is not yet installed.

On Wednesday, Mr. Perry was up on a "Tinsyde" giving a demonstration during which he put up an excellent show.

The chief topic of conversation at the aerodrome during the week end has naturally centred round the report of the Subsidies Committee and already there are numerous rumours and suggestions as to who are to be made directors, officials, etc.

It is probable that the report of the committee appointed to inquire into the problem of improving the air port will be issued very shortly. It is expected that the report will advocate the buying up of the old military aerodrome, and, by closing Plough Lane, make both aerodromes into one. This would increase the landing area by about a hundred per cent. and by taking in the land as far as the houses on the hill to the south would leave the hangars and offices in the centre. By this means machines could take off straight away from and land more or less towards the Custom House no matter from what direction the wind was blowing.

It is generally agreed that as regards site, Croydon cannot be improved. Any aerodrome nearer the centre of London is bound to be in the fog area, and, Croydon compared with places further in, is fairly free from fog.

Mr. Hubert Broad made a return flight from Paris by night on a D.H.9 on Friday. He tells one that he hopes to make soon a double journey by night. He will leave Croydon soon after dark and after just enough time to turn round at Le Bourgêt he will return to Croydon.

Monday was a blank day and on Tuesday the only machine to get through was Mr. Rogers on a Handley Page from Paris to London. M. Delage on a "Goliath" attempted to get through on Monday but was forced to land and completed his journey on Tuesday.

On Wednesday again a Handley Page was the only machine to complete a trip, when Mr. MacIntosh succeeded in getting through to Paris.

Thursday was a good day and a dozen machines made trips.

NEW UNDERCARRIAGES FOR OLD.

Mr. Leverton informs one that the new Fokkers with the "Eagle IX" Rolls-Royce engines are being fitted with lower undercarriages to lessen the likelihood of their being blown over on the ground in gusty weather as happened to Mr. Geysendorffer a week or so ago. Perhaps they might be wider also.

UN-(H)E[A]RNED INCREMENT.

The Daimler Airway had the pleasing job of carrying some tens of thousands of pounds' worth of bullion to Holland recently. Everyone including Mr. Herne, the pilot, was shocked at the unseemly levity with which the official people at each end of the journey treated a load which surely should have been received with awe and reverence. What a chance for an air pilot to buy a £500 Disposal S.E.5a with a machine-gun and shoot it down in a quiet marsh! Doubtless some of the descendants of the hereditary smugglers of Dungeness would have acted as ground staff.

HORA FUGENS.

Great excitement has been caused by an edifice outside Mr. Shaw's office. This is a gaily-coloured lamp-post bearing the name of his wares, lending a bodily air to his spiritual business. When alight at night it certainly adds to the brightness of the Broadway.—G. D.

THE NEW HANDASYDE.

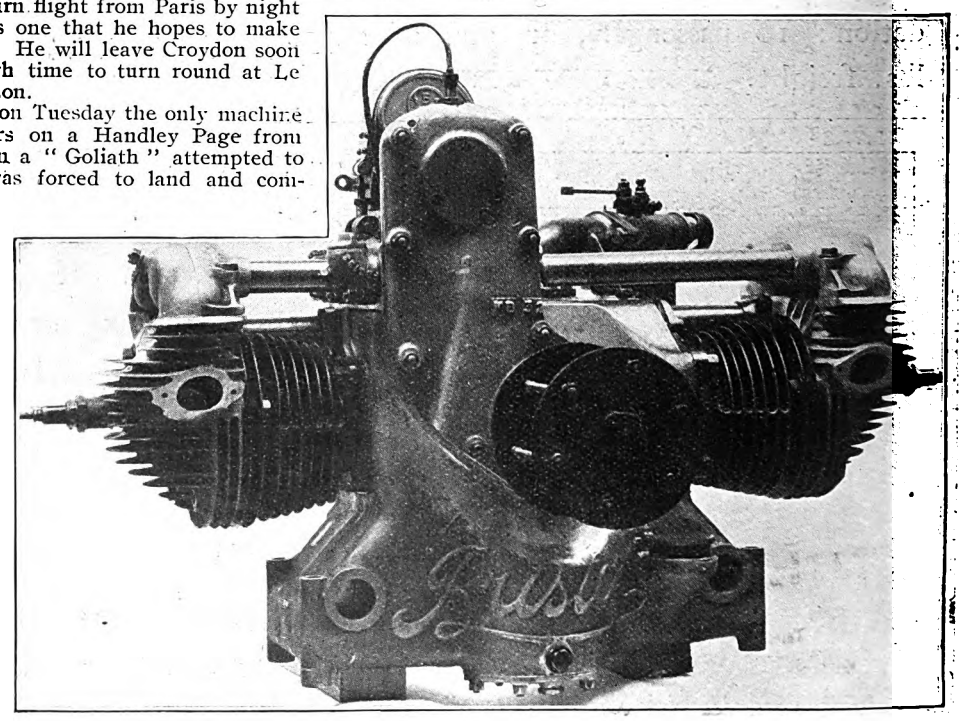
The Handasyde H.2 monoplane has been out quite often, but one is not able to announce any figures as regards her performance until another and more satisfactory engine is fitted. The machine was designed for a Rolls-Royce "Eagle IX," but so far it has been impossible to obtain anything but an aged "VIII," which has only been giving about 330 h.p., as against 400 h.p. expected from a "IX." Consequently the machine has not been seen at its best. Nevertheless, Mr. Handasyde says that the H.2 is well up to expectations on the r.p.m. for which she was designed.

Her cruising speed is a little more than 95 m.p.h., and landing speed roughly 47 m.p.h. Mr. Handasyde is endeavouring to procure another engine, and he may fit a Napier "Lion."

Messrs. Courtney and Raynham have flown the H.2, and both are very pleased with its "feel" in the air, saying it is very light on the controls. One understands that the only modification to be made is to increase slightly the size of the fin.

It is expected that Australian representatives will witness the official tests of the machine.

The Handasyde Company have sent a glider, slightly modified and improved as compared with the one flown at Itford, to a purchaser in New Zealand.—J. F. S.



THE BRISTOL "CHERUB."—The new Bristol engine which has been produced for use on minimum-power aeroplanes. It has cylinders 85 m/m. bore and 94 m/m. stroke (8.95-h.p. R.A.C. rating), weighs 85 lbs., is rated at 18 h.p. at 2,500 r.p.m. and actually gives 20 h.p. at that speed and 24 h.p. at 3,000 r.p.m.

The engine has been designed for aircraft work—and is far from being a glorified motor-cycle engine. It has passed successfully through a strenuous period of testing and has shown itself to be extremely reliable. It is officially known as the "Cherub," being a miniature "Jupiter" or "Lucifer" as may hap.

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WEYBRIDGE.

S/Ldr. R. M. Hill, M.C., A.F.C., R.A.F., gave a lecture on February 20th on "Pioneers of Flight" before the members of the Workers' Educational Association and their friends at Weybridge. Mr. C. E. Robson was in the Chair. S/Ldr. Hill's lecture covered pioneer work from Icarus to Bleriot's cross-Channel flight in 1909 and a number of interesting lantern slides were shown.—J. F. S.

THE DE HAVILLAND AIRCRAFT CO., LTD.

On Saturday, February 17th, the de Havilland Aircraft Co. played a staff team of the Aircraft Disposal Co. at Association football at Stag Lane Aerodrome, the result being 10—0 in favour of the De Havilland XI. This being the Aircraft Disposal Co.'s first match, the above result cannot be taken as a forecast of their future form. Major Stewart and Mr. S. C. Harrison played very well for the A.D.C. and as soon as the rest of the team get to know each other and find their form they should prove a very useful combination.

The A.D.C. turned up in force headed by Col. the Aerial Darby, to cheer their team. Assiduous practice and the study of form in the seclusion of the baronial halls at Waddon should assist in making the score more pleasant to look upon in their return match.

THE SCHNEIDER CUP.

For the forthcoming Schneider Cup Race which will be held in this country some time in August or September four French entries have been received by the Aero Club of France.

These are :—(1) Société Industrielle de Caudebec en Caux (Latham et Cie.), two machines; (2) Société Aeronautique Blanchard, two machines.

The two latter machines will be single-engined flying-boats of 400 h.p.

CANADIAN-BUILT AMPHIBIANS.

The Canadian Government has placed an order with Vickers Ltd. for eight "Viking IVs," but have stipulated that they must be constructed in Canada, not merely erected after having been shipped from this country. Therefore the machines will be built at the Vickers Canadian branch at Montreal under the supervision of Mr. P. Maxwell-Muller and a selected party from the Brooklands works. Mr. Muller left England for Montreal on the 23rd, and will probably return, after giving the Montreal branch the benefit of his experience, in about six or eight weeks' time. The other members of the party from the works will remain in Canada for a much longer period. Aeroplanes have never yet been built at the Vickers Montreal works.—J. F. S.

FRENCH AIRCRAFT FOR OUR ENEMIES.

According to the *Times* Paris correspondent in a communication dated February 16th, M. André Tardieu has called the attention of the Chamber of Deputies to the sales of aeroplanes of French manufacture to the Russian Soviet Government. Also in the *Echo National* M. Tardieu quoted a statement by M. Poincaré in regard to the gifts of war material to the Kemalists. He stated that in January 1921 on M. Briand's order, war material, including ten aeroplanes was delivered to the Turks.

M. Tardieu stated that it is useless to aid Poland with a loan if at the same time her possibly dangerous adversary obtains French Aeroplanes. And his statement in the Chamber of Deputies shows that he is alive to the folly of supporting the Turks in their attempt to upset the peace of Europe.

EFFICIENCY IN AUSTRALIA.

The Western Australian Airways Ltd., the first Australian air-mail line, is claimed to be the most efficient air line in the world. In regular operation since April, 1922, the service to the end of the year was maintained with 97 per cent. regularity along the 1,195-mile route from Geraldton to Derby. During that period 86,000 miles were flown and 70,000 letters were carried. Valuable freight averages 600 lbs. per month. Much of this was from the pearl fisheries of the north-western coast.

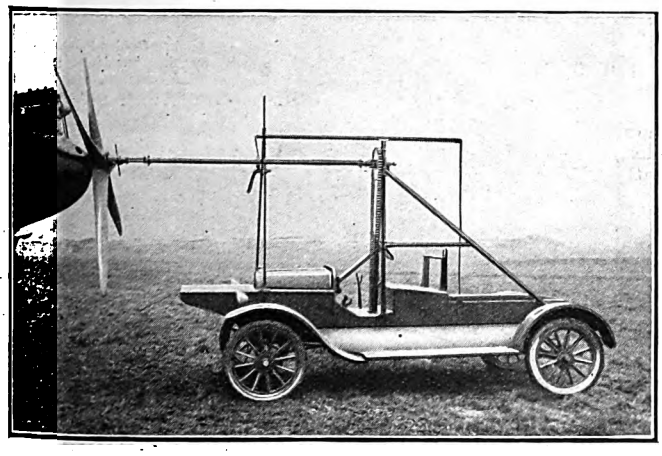
The growing popularity of this regular and speedy service is evidenced by the fact that the 4,000 letters carried in April had increased to 12,000 in November.

As to the saving of time it need only be mentioned that the eleven days occupied in the trip by coastal steamer from Perth to Broome is reduced to two days if the air line is used from Geraldton. The value of the service is so appreciated that local interests are pressing for the route to be extended a further 300 miles to Wyndham.

The type of aircraft in use on this route is the well-known Bristol three-seater "Tourer" with Siddeley "Puma" engine, and the proprietors have expressed the highest satisfaction with the excellent service which the machines have given.

PILOTS FOR NEWFOUNDLAND.

The Aerial Survey Co. of Newfoundland have recently engaged two new pilots for their surveying work, Mr. Maurice W. Baseden formerly of 28 Squadron R.A.F. and Mr. T. Knowles Breakell formerly of 31 Squadron R.A.F.



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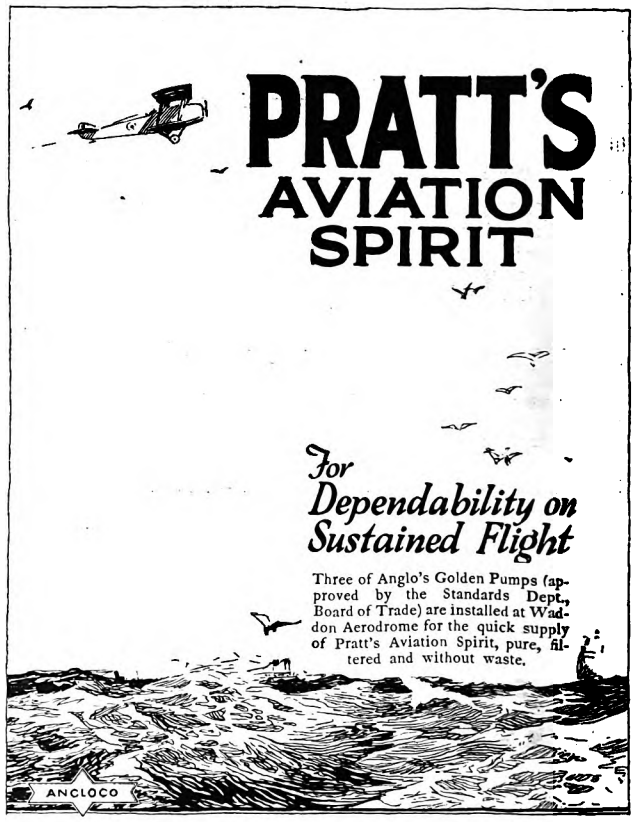
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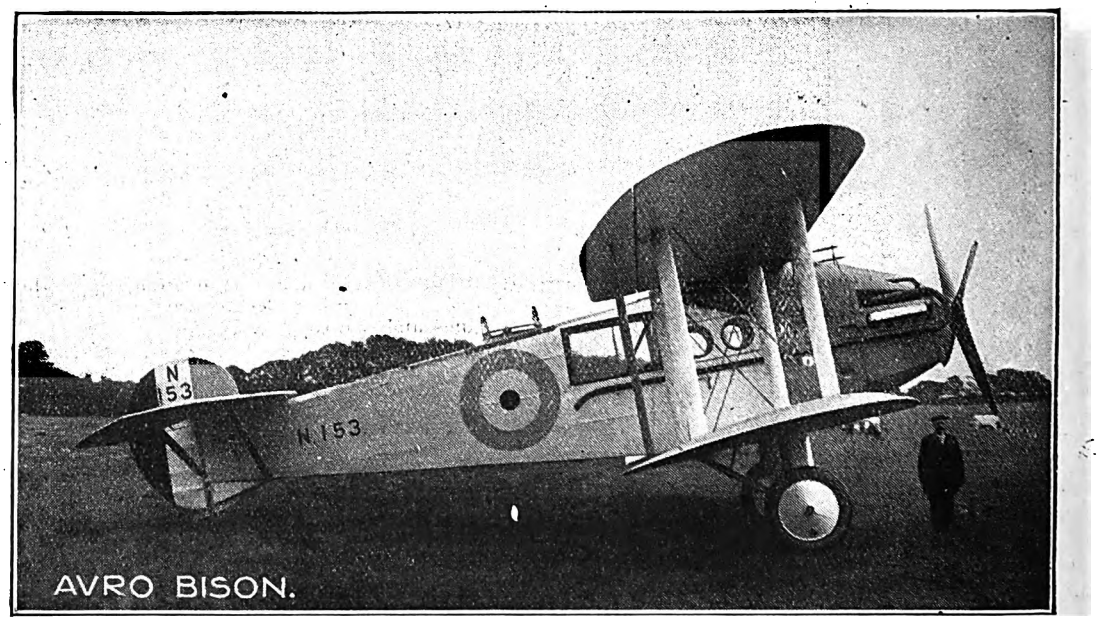

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ON THE LATEST CIVIL AVIATION SCHEME.

Naturally the leading topic of the past week has been the report of the Committee appointed by the Secretary of State for Air to inquire into the possibilities of Civil Aviation. Taking an average of the opinions expressed the general opinion among aeronautical people seems to be that if the Government *must* do something to maintain our air lines then the £1,000,000 ten-year one-company scheme is the best way of doing it. In fact the attitude seems to be very much that of *Punch's* classic critique of a best-seller book many years ago,—"For those who like this kind of thing this is exactly the kind of thing they will like."

But so far as the aircraft and aero-engine people are concerned, whatever may be the official opinion of the S.B.A.C., most of them as individuals agree more and more firmly with Mr. Churchill's dictum of a year or two ago that "Civil Aviation must fly by itself." Like most of Mr. Churchill's statements people jeered at it or abused it at the time and have come to believe in it in the light of history—as for instance the "swarm of hornets" and the "dig them out like rats" phrases. The truth of the matter is that so far as the Aircraft Industry is concerned there is no money in Civil Aviation and that if the money that has been and is being and is going to be spent on Civil Aviation had been or were spent on building new experimental aeroplanes we should be very much nearer Commercial Aeronautics two or three years hence than we can possibly be under existing conditions.

For the present there is practically no connection between Civil Aviation and Commercial Aeronautics. As one esteemed correspondent, an eminently successful business man, put it "In my opinion Civil Aviation is to-day a political question and not a commercial one. As to how soon it will develop in the latter form is a matter on which I am unable to express any opinion."

Rushing in where the business angel fears to tread one says unhesitatingly that when aeroplane designers give us cheaply-built aeroplanes with variable-lift wings and when engine designers give us cheaply-built engines which do not use petrol Civil Aviation will develop in a commercial form. And that date would easily be reached two years hence if the million pounds which it is proposed to spend in the form of a subsidy were spent on what our high-browed scientists insist on calling *ad hoc* research—to differentiate it from that pleasant and leisurely form of blind-man's-buff which they call basic research.

The Trade View.

Looking at it purely from the Trade point of view there is nothing in Civil Aviation and there cannot be anything in it for many years to come. Reduce the whole thing to a Euclidian argument and look at it as a simple problem. What the Trade wants is orders. Without orders the Trade cannot afford to build new machines. And without new machines there cannot be any progress towards the production of a commercial aeroplane which will earn its keep. Will subsidised Civil Aviation result in worth-while orders for the Trade? Let us see.—

Suppose for example that thanks to the subsidy the new airline firm as an advertisement decided to abolish all passenger fares and carry free of charge to Paris, Cologne and Amsterdam or beyond everybody who wanted to travel. How many free joy-ride passengers could be got per diem?

One has no figures for the cross-Channel boat services, but it must be recognised that quite a number of people would for some years to come rather pay to go by boat than travel for nothing by air. Also the free passage would not tempt an enormous number of people who would otherwise stop at home, for even if they were transported free they would still have to get away from work and would still have to pay their cost of living while abroad. If therefore one put the number of passengers at 800 per diem outward and 800 per diem inward one would probably err on the generous side.

Now 800 passengers each way means 100 machines each way per diem. Which means 200 machines in and out of the Terminal Aerodrome. Which means even in a Summer day 20 machines per hour. Which means a machine in or out every three minutes. Which means unpleasant crowding of the ground and air, for the machines could not be exactly on time all day and would be bound to become "bunched," even as motor-busses do. Still, give them the full 200 machines a day, and what about it?

A Definite Demonstration.

The Daimler Airway has demonstrated conclusively that in an efficiently managed air line a London-Paris service of three trips out and three trips in per diem, that is to say six trips, can be maintained with a total fleet of two machines, and that such a service can be assured even against collisions and breakdowns with four machines. Therefore let us extend each line to double the length of the London-Paris run, and let us on the other hand have only one trip out and one trip in per diem instead of three and obviously the service of 100 machines out and 100 machines in, that is to say 200 trips, can be assured by a fleet of 400 machines even by an organisation less efficient than that of the Daimler-Airway.

And what is a fleet of 400 eight-seater single-engined aeroplanes worth as a means of maintaining a whole aircraft industry? The first order for 400 machines, totalling with engines and spares perhaps £4,000,000, would be very welcome. But what would it be worth afterwards?

Again that confoundedly efficient Daimler Airway comes along and exposes the futility of Civil Aviation from the Trade's point of view. The Daimler Airway has proved by the running of the De Havilland 34 indexed G-EBBS that an aeroplane can be flown 120,000 miles and not need a new wire or a new coat of dope, let alone reconditioning or even a general overhaul. G-EBBS after all last season's flying is as fit to-day for all this year's flying as if she had just come out of the De Havilland shops. Which is very fine testimony to De Havilland workmanship and to Daimler care and maintenance, but is no sort of use as an aeroplane builder's proposition.

It is true that out of six machines altogether which the Daimler Airway have had one (a D.H.18) was a total loss in a collision another was completely written-off and of the other four two were damaged in a collision on the ground at Croydon during test flying and two had to be rebuilt. But the Trade could not hope for one machine in every five per annum to be a complete loss in a collision: and at any rate if such were the average there would soon be an end to Civil Aviation. Nor can the Trade reckon even on four re-builds out of six machines per annum, for with increased traffic on the 200 machines per diem basis the traffic regulations would be such as to make ground collisions almost impossible.

Therefore one can only reckon on the showing of G-EBBS and allow a little for depreciation and accidents in forced landings. On that showing the Trade would be very lucky if after supplying the original 400 machines it were called upon to supply 20 new machines per annum thereafter and to re-build or re-condition another 20 machines per annum. Which, as Euclid says, is absurd.—Q.E.D.

Therefore why waste £1,000,000 in subsidies plus another £1,000,000 of money to be raised in the City of London on trying to run air lines? The money will all be spent on running machines of existing types at a heavy loss, whereas it might much better be spent on experimenting to produce machines of quite different types which can be run at a profit.

The R.A.F. View.

Probably the first reply will be the usual fatuous remark that we must support Civil Aviation because we shall need our commercial air fleet as a reserve of men and machines for the Royal Air Force in time of war. Just because the Mercantile Marine did nearly all the sea work that was at all effective during the War 1914-18 owing to the mismanagement of the Navy certain people will insist on believing that the R.A.F. is going to be as futile in the next war as the Navy was in the last.

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The cases are not in the least analogous. Barring the Helgoland Bight affair and the Battle of Jutland the Navy never had to fight a regular fleet action all through the War.

But in the next war the R.A.F. will have to fight the whole time from start to finish. Our swarms of armed merchantmen and trawlers and so forth were good enough against a few German submarines, but what earthly use could they have been against real warships? And gallant as our merchant sailors were what could they possibly have done against trained fighting seamen?

We had an immensely preponderant fleet of fighting ships so the enemy's fleet naturally did not come out to fight them. But is there anybody who is such an abject fool as to think that if Russia has an immensely preponderant air fleet in the next war that fleet is going to be tucked away in the fastnesses of the Ural Mountains, as we tucked our Battle Fleet away at Scapa and in the Forth, to wait for our little air fleet to fly over to Russia and be crashed in flames? There are no submarines in the air, so the big fleet can safely come out and do its job.

If Russia should have a great air fleet of trained fighting men what use will it be to send against it the few dozen passenger-carrrying aeroplanes which would be enough to assure the running of all the air-lines we are likely to organise in the next ten years? What use would either our men or our machines be?

Only the other day one took down to Croydon an R.A.F. officer who has a long and distinctly good service record, chiefly concerned with bombing, and strangely enough he had never seen a civilian aeroplane at close quarters. He inspected all the types of so-called commercial machines and simply laughed at the idea of making any of them into bombing or fighting machines which could be of any use against anybody except undefended niggers. And against niggers or even against a fairly well-equipped enemy air force he said that he would prefer the old war-time machines which the R.A.F. are still using to anything which could be made out of altering the civilian aeroplanes of to-day.

The only thing that struck him about the civilian machines was that they had aperiodic compasses and new wireless equipment and sundry fascinating gadgets and whatnots which apparently have not as yet penetrated through the R.A.F. equipment people to R.A.F. squadrons in being. Apart from that the machines at Croydon considered for possible use in war struck him as being merely funny.

And be it remembered the civilian aeroplane of to-day is much nearer to its parents the war machines of yesterday than will its progeny the civilian machines of to-morrow be to their cousins the war machines of to-morrow. In the next war it will be as silly to compare the R.A.F. war machine with a commerical aeroplane as it would have been to have compared the Guardee of 1914 with the conscript of 1917, or to have compared the engine-room-artificer R.N. of 1914 with the donkey-man of a tramp of the same period.

The Civilian Pilot.

Which last remark is by way of being a reply to the fatuous idea that the personnel of a commercial air fleet is going to be any use in war. It may be granted that the civilian pilots of to-day would be useful in a war next year or the year after, for a good many of them are experienced war pilots, though as a matter of fact a large proportion of the best air-line pilots have never been fighting pilots but were during the war either instructors at home or ferry pilots who never saw a shot fired in the air. Which seems to bear out one's old argument that the harum-scarum single-seat fighter pilot is not fitted by temperament for the humdrum work of being a chauffeur on an air-liner.

Still, while the air routes are as they are to-day without proper observation posts and without proper weather communications to pilots while in the air and while single-engined machines are used which are liable to forced landings the air-line pilot of to-day needs some of the pluck and resourcefulness and quickness of decision which is needed by a war pilot. And so the pilots of to-day would be useful in war for ferry work or perhaps for bombing, if not for high-speed fighting machines.

But when air routes are properly equipped so that a pilot merely has to fly to signals and when commercial aeroplanes have so many engines that they do not suffer from forced landings and when they have wings which will get them off the ground at 20 or 30 miles an hour and will land them automatically in an ordinary football field, then the air-line pilot will need the temperament of a motor-'bus driver who can look forward with equanimity to driving over the same route day after day in all weathers till he retires with an old-age pension.

That man is going to be precious little use in war for he will know nothing of navigation or of finding his way over strange country. And even if employed only as a chauffeur with an officer-navigator to direct him he will still lack knowledge of the handling of war machines and he will lack still more the readiness in emergency of the trained war pilot.

Civilian Mechanics.

Similarly the air-line mechanics will be of little use in war. They will have no knowledge of the rigging or fitting of war machines and they will be quite ignorant of the high-pressure engines designed specially for war purposes. The gadgets of a war machine, gun fittings, bomb sights, camera arrangements and so forth will be absolutely strange to them. So if drafted to a war squadron they would be merely in the way.

The mechanic in a war squadron has to be a specialist. In a squadron on a war footing each machine should have its own crew. A squadron comes in from patrol and has to go out again at once. Every machine has to be handled at once. Each machine has to have a couple of men to go over the engine, a couple more to refill its petrol and oil tanks, a couple more to go over the rigging or aeroplane fittings as distinct from the engine, a couple more to replace machine-gun ammunition, another to take out and replace photographic plates, a couple more to re-fit bombs, and an N.C.O. to see that all do the jobs they are detailed to do. And every man has to know his job. Already our people in Iraq are beginning to find that the youngsters just out from Halton and Cranwell are shaping into being their best men because they are young, deadly keen, well taught, and above all only know their jobs as R.A.F. mechanics and so have no preconceived prejudices.

Foolish people argue that if in an air-line only three or four mechanics are necessary to keep a machine fit for work the R.A.F ought to be able to do the same. It never occurs to them that in an air line while one machine is away the men are working on another whereas in a squadron at war all the machines are away at once and the men are doing nothing for a period and that for a further period of perhaps 12 hours at a stretch every man is working like a slave, and that every man is doing specialised work for which he has been trained for years beforehand.

Some of the best air-line mechanics would in war be very useful in acceptance depots at home or in repair-shops behind the lines, but few would be any good with squadrons in the field. And so the R.A.F. must depend for its mechanics as well as for its pilots on its own supplies.

It is sheer lunacy to imagine that in time of war either the aeroplanes, the engines, the pilots or the mechanics of the air lines can possibly be of any immediate use in war, though after a period of organisation no doubt some use will be found for them. The one essential fact which must be driven home to all those who are so interested in aviation and so ignorant of its needs is that the R.A.F. must be a self-contained self-supporting fighting force adequately equipped and adequately manned to fight a first-class war to-morrow. And therefore any money which this country can spare for Aviation ought to be spent on the Royal Air Force and not on uncommercial speculations.

Why?

Presumably the Government does not want to spend money on air lines just for the fun of seeing machines flying in and out of Croydon or merely for the sake of providing jobs for Civil Aviation officials. There will always be a certain amount of civilian flying and that amount will go on increasing slowly or rapidly according to whether and how it is encouraged. Personally one does not believe that subsidies which make it possible to run air lines with non-commercial machines are anything like the right form of encouragement. It may be assumed that the Government's idea in finding money for such a subsidy is to help British trade and to maintain the British Aircraft Industry so that it will be able to equip the R.A.F. with the best possible machines in time of war.

One has proved fairly conclusively that Civil Aviation as supported by this proposed subsidy is no use to the British Aircraft Industry and no use to the R.A.F. If anybody can controvert the arguments set forth then one will be glad to give him or her as much space in THE AEROPLANE as may be required to demonstrate that one is wrong. But if the subsidy is no use to either the Trade or the R.A.F. then what use is it?

Foreign Missions.

If the Government wants to spend a million for the good of the Trade, instead of throwing it away in doles to the unemployed and unemployable then there are many ways in which it can do so and help the progress of Aviation at the same time.

For example, except for the Japanese Naval Air Service and the Chilian Army and Navy we have little or no influence among the Air Forces of foreign nations. Before the War 1914-18, the British Navy used to send official missions to train the Navies of all nations, with the result that the British ship-building trade practically supplied the Navies

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The Fairey Aviation Company,
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Head Office - - - - HAYES, MIDDLESEX.
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Contractors to British Admiralty, War Office and Air Ministry.

Sole Patentees of the Fairey Patent Variable Camber Gear for Aeroplanes Seaplanes and Flying Boats.

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Constructeurs de toutes espèces d'hydravions, bateaux volants, aéroplanes, appareils amphibies avions spécialement aménagés pour levées topographiques et photographiques, hangars flottants et équipement complet pour ces derniers.

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Proveedores del Almirantazgo, Departamento de Guerra y Ministerio de Aviación Británicos.

Unicos poseedores de la patente Fairey de dispositivos de combeo variable para aeroplanos, hidroaviones y barcos aéreos.

Diseñadores y constructores de hidroaviones, barcos, aéreos, aeroplanos, aparatos anfibios, de todas clases, tambien de aparatos especialmente adecuados para el levantamiento de cartas topográficas y fotográfias, hangares flotantes y completo equipo para estos mismos.

Diseñadores, por orden especial del Gobierno Británico del barco aéreo más grande que se ha construido para este gobierno.

Proveedores de todo lo necesario para servicios de transporte aéreo de pasajeros, correos y mercancías.

Diseñadores y constructores del tipo Fairey III. Serie de aparatos suministrados en grandes cantidades al Gobierno Británico, durante la guerra y después de su terminación. En esta serie de paratos, el fuselage, el plano central y la unidad de la cola, son de tipo normal y fabricados para adaptarse á diferentes tipos de alas, chassis y motores de otros aparatos de series que sean adecuadas para los fines particulares a que se destina el aparato en cada caso. Todas les máquinas de este tipo, tienen alas plegadizas y están provistas del dispositivo patentado de combeo variable Fairey que da una alta capacidad y potencia de ascensión combinada con una velocidad baja de aterrizaje.

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of the World. This had the double result of keeping our ship-yards busy and of our having on the stocks at any time a number of war-ships which we could commandeer for our own use in time of need—as we have done on several occasions.

The R.A.F. did send such a mission to Greece, which was about the worst country in the World to have backed in such a way both for political reasons and from the point of view of results achieved. The R.A.F. also proposed to send a mission to Japan but that was choked off by the representations of the Government of the United States, though Colonel Sempill's highly successful and purely commercial mission had just the same practical effect. Apart from those two nations the Air Ministry has not attempted to do anything to help the Trade on which its existence depends, for Chile was won purely by private enterprise.

The rest of our 22 or 24 Allies of the so-called Great War have been left to our bigger Allies. In spite of the fact that we trained Brazilian Naval aviators to fly during the War the American Navy has established a Naval Aviation Mission at Rio and the American Trade has got the Brazilian orders for seaplanes.

France has collared pretty well everything else. Brazilian Army Aviation and Japanese Army Aviation are purely French. The Argentine is French. Siam is French. Spain is almost purely French except for Italian-German seaplanes.

Poland is French. Jugo-Slavia, such as it is, is French. Czecho-Slovakia is French except where it is German. And so on.

Fortunately the French system of training both pilots and mechanics is so thoroughly bad that all the nations who have relied on French instruction are already rather bored with it. And here is our opportunity if we can use it. The Air Ministry cannot well send R.A.F. missions to cut out our esteemed Allies. But there is no reason why the Civil side of the Air Ministry should not give financial backing to approved missions composed of retired or demobilised or half-pay R.A.F. officers to these rather bored countries.

If such missions were as successful as those to Japan and Chile we should soon feel an appreciable financial benefit. Which is certainly what we shall not feel from any air-line subsidy.

Business is Business.

After all business is business and one cannot go on for ever considering the feelings of one's next-door neighbour. France has never made the slightest effort in the direction of paying her war debts to us. Instead she has splashed these aviation missions all over the World and has cut us out of the aircraft business of those countries. With the proceeds and with the money she is not paying to us she is building a huge air fleet which, as Major C. C. Turner pointed out in the *Telegraph* last week, is at least as much a menace to us as to any other nation.

Not that one regards the French air fleet as any particular menace, for our own R.A.F. people are very well able to look after themselves up to a ratio of about 10 to 1. And from what one knows of French aviation and organisation one judges that France would be very lucky if out of her 200 and odd squadrons she could ever find 20 capable of getting off the ground as complete units at the same time.

In any case France cannot afford to fall out with us, for the French Government knows very well that if we stood back and left the ring clear Germany would have France back across the Rhine in six months, out of Elsass-Lothringen in a year and would be dictating peace in Paris within twelve months after that. All that France is trying to do in the Ruhr at present is to break Germany's commerce, not to get reparations out of Germany with which to pay us. And all that France is accomplishing in the Ruhr is the consolidation of German patriotism.

Previously the German Army was defeated but not broken. To-day the Fatherland is invaded. Which is a very different matter as France will discover if she goes on behaving like a revengeful woman and provokes Germany to kick back. And if that kick comes France will find very little anxiety in this country to fly to her help, despite the selected letters in the *Daily Mail*.

That being so one fails to see why our Government if it desires to help British aircraft business abroad should not subsidise foreign missions which can quite possibly earn money instead of subsidising air lines which definitely can not.

The Right Sort of Encouragement.

Apart from that civil aviation at home can be encouraged in many ways at little or no expense. Many sportsmen would run private aeroplanes and joy-ride concerns would stand a better chance if landing fees and garage fees and inspection fees and licence fees were abolished for a few years. The revenue from these sources cannot pay the salary of an acting-sub-assistant-deputy-director at the Air Ministry but the cost of these fees to individuals is a very serious consideration. Given free landings and free shed accommodation and so forth and there would be quite a lot of little experimental machines built and flown, all of which would make for progress in Civil Aviation.

But the one thing which would go farther than anything else to produce truly commercial aeroplanes would be the expenditure of a million or so on building purely experimental aeroplanes and engines. Give the Aircraft Trade the money to produce new machines and the machines will be produced. The commercial aeroplane is an engineering problem. It cannot be got by juggling with air-line organisation. Set our designers the task of building for economy in production and in running instead of for sheer brute-force performance and in a year or two we shall have commercial aeroplanes which are a commercial proposition. And then Civil Aviation will be able to fly by itself.—C. G. G.

AIRCRAFT IN PARLIAMENT.

National and Imperial Defence.

The following is taken from the *Times* of Mar. 6:—

Mr. Bonar Law, replying to Viscount Curzon (Battersea, S., U.), who asked whether the Navy was to have the sole control and responsibilty for its own air arm, said:—I have decided to appoint a Committee to inquire into the co-operation and correlation of the three Services from the point of view of national and Imperial defence, of which the question will form a specific part.

Viscount Curzon further asked what would be the terms of reference, whether the question was to be decided as a whole, or whether the Navy question would receive prior consideration.

Mr. Bonar Law replied that the terms of the reference were being prepared. Captain W. Benn asked if they could have an assurance that no action would be taken which might disintegrate the Air Force without the direct consent of the House. Commander Bellairs (Maidstone, U.).—Were we not given a promise last spring of the appointment of this Committee? Mr. Bonar Law.—This Committee has now been set up. I would not like to say that no change will be made before it has been submitted to the House, but it is very unlikely. Mr. Pringle (Penistone, L.).—Will the right hon. gentleman state the composition of the Committee? Mr. Bonar Law.—We have chosen the names, but we have not got their consent.

Air-Line Affairs.

On Mar. 1, in reply to Lieut.-Col. Nall, the Secretary of State for Air said that 18 pilots and 117 ground engineers, fitters, riggers, storemen, labourers, clerks and other miscellaneous employés are employed by the three companies in receipt of the civil aircraft subsidy. Lieut.-Col. Nall thought that the numbers employed were very small for the money expended by the State and suggested that the Government would get better value by diverting this money to augmenting the regular Air Force.

On Mar. 1, in reply to Mr. Johnston, the Secretary of State for Air said that the names of the members of the Departmental Committee appointed to consider the question of Government subsidies to Air Transport are Sir Herbert Hambling, J.P. (Chairman), Sir Joseph Broadbank, J.P., Mr. Oliver V. G. Hoare. These gentlemen were nominated on account of their special qualifications for dealing with a matter which was fundamentally a business question and one not calling for the possession of personal experience of aerial navigation. Mr. Johnston thought it inadvisable that of this Committee of three persons one should be the brother, another the brother's partner and the third the late partner of the Air Minister himself. Sir S. Hoare disagreed from Mr. Johnston.

The R.A.F. in Iraq.

On Mar. 1, introducing the Supplementary Estimate for the Middle Eastern Services the Under-Secretary of State for the Colonies made the following statement: "When the rapid Turkish advance took place, and Smyrna was captured, it was felt that no British garrison, no British reserves anywhere in the Middle East, could be reduced pending any eventuality that might arise out of the sudden Turkish victory. Consequently, from the end of July last year, there have not been military and Air Force reductions in Iraq as was originally contemplated. As a matter of fact this Supplementary Estimate would have been larger on that account had not really great efforts been made, and more especially by the Air Officer Commanding, Sir John Salmond, to economise, and I say quite frankly that there was room for economy in the actual administration of the Force under this command."

Referring to Subhead (1) Mr. Ormsby-Gore said: "I should like to pay a tribute to the manner in which during the last few difficult months, with the strain on the northern frontier of Iraq, the Air Officer Commanding, the first man who has had, as it were, the independent air command, the first officer there being Commander-in-Chief of all the forces in the country, has maintained peace and order and the efficiency of his force, and also some recognition of the way the whole people and King Feisal and his brother, who went up to Mosul during the difficult time of the last few months have stood staunch to their country and to the Iraq Government."

(*Continued on page* 182.)

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The much discussed report on the future method of subsidising Air Transport which has just been published discloses certain figures concerning the cost of Civilian Air Transport which have not previously been generally available. Some of these figures are startling and most of them are instructive.

Some account of these statistics, together with reflections thereon, are given in the article below.

The new two-cylinder engine for low-powered aircraft, developed by the Bristol Co., is described and illustrated in detail in this issue. The production of this engine is evidence of very considerable enterprise on the part of the firm and one must hope that they will reap a due reward in the shape of sales.

There is evidence of very great general interest in the class of machine for which this engine has been designed, and the Bristol Co., by being first in the field with a suitable engine, should at least secure any business that is available in this direction.

THE COST OF SUBSIDISED AIR TRANSPORT.

The Report of the Civil Air Transport Subsidies Committee, which has just been published, contains among other things a certain amount of information as to the actual cost of running the British Air Lines during the period since Mar. 19, 1921, when the first "temporary" subsidy scheme was adopted. Unfortunately the accounts for the periods later than Mar. 31, 1922, when the "temporary" scheme came to an end are still undergoing audit by the Government, and complete statistics as to this period are not available.

THE TEMPORARY SCHEME.

Under the first "temporary" scheme the Government guaranteed to the companies a clear profit of 10 per cent. on their gross revenue. The total Government liability was limited to a sum of £50,000 for the period Mar. 19—Oct. 18, 1921, and to £38,200 for the period Oct. 19, 1921—Mar. 31, 1922, or £88,200 for the whole period.

Of the total subsidy £75 per flight was payable on account fortnightly, the balance being adjusted on audit of the accounts at the end of the period. The schedule of flights, time-table, freight charges, and types of machine used were to be approved by the Air Ministry.

WHERE THE MONEY WENT.

Subject to final adjustment, the accounts for this period are available for analysis. The total number of single flights made was 1,072, and the total number of passengers carried was 5,804 (an average of 5.4 passengers per flight). The revenue from passengers and freight amounted to £38,211, of which £9,888 or 26 per cent. was absorbed in agents' commissions and the cost of road transport to and from aerodromes. There were miscellaneous receipts of £1,101, producing a total revenue of £29,424. The total expenditure was £120,493. The revenue from all sources—except subsidies—was therefore less than 25 per cent. of the total expenditure.

Subsidies to the extent of £85,671 were paid, leaving a loss to the companies of £5,398. It is nowhere explained how this account is to be reconciled with the guaranteed 10 per cent. profit on gross receipts. It is true that the whole sum to which the Government liability was limited was insufficient to provide this profit, but it would have sufficed to reduce the companies' loss to about one-half of the figure given. In the report the costs of this period are analysed. This analysis shows that flying charges (petrol and oil, pilots' and mechanics' flying pay, and wireless) amounted to 2s. per machine mile and to £4 2s. 6d. per passenger. Non-flying costs (repairs, maintenance, depreciation, insurance, ground and office wages and salaries, etc.) amounted to 5s. per machine mile and to £10 6s. 2d. per passenger, and overhead charges work out at 3s. per machine mile and £6 6s. 7d. per passenger. The total costs were 10s. per machine mile and £20 15s. 3d. per passenger.

The subsidy paid was 7s. 1d. per machine mile and £14 15s. per passenger.

The regular fare was then—as now—£6 6s. per passenger and a little more than this was absorbed by overhead charges alone

NON-FLYING AND FLYING COSTS.

Non-flying costs per passenger are 168 per cent. of the fare per passenger, and flying costs are 66 per cent. of the fare.

The enormous disproportion between flying and non-flying costs shown in this analysis is the most interesting feature of the accounts. Some such disproportion is inevitable at the inauguration of any new transport undertaking, and very particularly in the case of an entirely novel form of transport. It arises from the fact that traffic does not spring suddenly into a full-fledged existence, but is of more or less slow growth. On the other hand it is necessary to begin operations with an establishment and an equipment which cannot be reduced below a certain minimum in cost as in other directions, and there is always a period when the traffic revenue is negligible in comparison to the standing charges.

For certain very obvious reasons this particular difficulty was bound to be acute in the case of air transport—and, although these figures are somewhat startling, they do not necessarily mean that air transport as a commercial proposition is hopeless. If it were possible to gain any very definite information as to how the relative figures for flying and non-flying costs have altered in their proportions since this period, it would be possible to make an estimate of progress made and of the future prospects. Unfortunately later accounts are not yet in a condition to be analysed in this manner.

Nevertheless there is a good deal of comfort to be derived from the fact that even at that date the flying costs were well within the revenue which could be and was earned. From this one is entitled to draw the inference that air transport can be made to pay if sufficient traffic can be assured and if administrative and overhead charges can be kept down to reasonable figures.

THE "PERMANENT" SCHEME.

The so-called "permanent" scheme which succeeded to the temporary scheme was in operation for six months. This provided for a subsidy of 25 per cent. of the gross earnings from passengers, goods and mails plus a grant of £3 per head and 3d. per lb. on the London-Paris route. On the Brussels route the grant per head was on a sliding scale, varying from £7 10s. per head if less than five passengers were carried (presumably per trip) to £2 15s. per head if more than eight were carried. In addition the Air Ministry were to provide roughly 50 per cent. of the total fleet operated on a hire-purchase system by which machines so provided became the property of the companies on a payment of 75 per cent. of their cost in 30 monthly instalments. The Air Ministry also undertook to pay 50 per cent. of the insurance

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premiums taken out by the companies up to a limit of 10 per cent. per annum on the value insured.

The maximum liability of the Ministry was to be limited to £200,000 p.a. for all purposes.

ESTIMATES—AND FACTS.

The estimates for this scheme were prepared on the assumption that the traffic of 1922 would be roughly twice that of 1921. It was very soon obvious that this estimate was far from the truth, and the scheme was found to be unworkable. There was nothing like enough traffic to keep the three competing companies alive on the London-Paris route and the permanent scheme was replaced by the present revised scheme on Oct. 1, 1922. During the six months of operation of the permanent scheme 1,588 flights were made and 5,860 passengers were carried, an average of 3.7 passengers per flight. Thus the passengers carried and the number of flights of this six months were both in excess of those of the preceding 12 months. But it is to be remembered that the summer traffic of 1921 was very much greater than the winter traffic of 1920/21 and that the increase is far from a doubling of the summer traffic of the earlier year. The number of passengers per trip has seriously decreased, and naturally this fact would lead to increase in cost per passenger—at least so far as flying cost was concerned.

Actually the companies lost heavily owing to this failure of the traffic to increase as had been hoped and *ex-gratia* payments—over and above the subsidies to which they were entitled—had to be made to them.

MORE MONEY—LESS WORK.

The gross revenue from passengers, mails and goods was £38,184—almost precisely the same as that of the earlier 12-months period—so that a substantially smaller revenue per flight was secured. The subsidies earned were £31,130 and the *ex-gratia* compensation given to them was £66,199. The total public assistance received was therefore £97,329—or £12,000 more than had been paid on the same gross revenue during the 12 months of the temporary scheme. The total public assistance amounted to 3s. 8d. per machine mile and to £11 5s. 10d. per passenger. Otherwise no analysis is available of the costs for this period. But it seems fairly reasonable to suppose that the total receipts of the companies did not provide any appreciable profit on working. These receipts—gross revenue plus subsidy and compensation—amount to £135,513 and one may safely assume that the cost of the services was not less than this total, which is roughly £15,000 more than the total expenditure for the 12 months of the "temporary" scheme. This excess expenditure was required to carry only 54 more passengers than were carried in the earlier period. The larger number of passengers was carried in a shorter total period—so that the traffic intensity was greater in the second period, and that by itself should, other things being equal, lead to reduced costs per passenger.

WASTEFUL COMPETITION.

It is perfectly obvious therefore that with the three companies all competing on the same route, the overhead and establishment charges increased out of proportion to the increase of traffic and the service provided by the three companies was greater than the traffic warranted. This is obvious from the reduced average of passengers per flight. This is definite evidence that the competition was more intense than the business available justified, and the effect of the competition was the opposite to that hoped for. The committee themselves comment on the fact that one result of this competition was "the development of new theories connected with the intensive use of aircraft." This refers of course to the work of the Daimler line, and there can be little doubt that, if one could analyse the accounts in detail, one would find that the competition did result in more economical working in certain important respects. The experiment therefore may have been worth trying.

For the present revised scheme no data are as yet available. Estimates exist—but they are of little value. The evidence of the two earlier periods however seems to be distinctly valuable. It is pretty certain that civil air transport is not prohibitively costly so far as the actual expenses directly involved in flying are concerned. The cost of petrol, of oil and of pilots is—at present at least—unimportant. The cost of being prepared to run an air service is the serious factor. That is to say that the cost of management, of ground staff, of facilities for carrying out repairs and so forth are excessive—and this can be traced firstly to the fact that present services are on too small a scale to bear those charges, and secondly to the fact that from lack of experience it is not yet possible to determine what precise organisation is necessary. These are difficulties which can be overcome—but time and patience—and a good deal of money—will necessarily be expended in the process. The progress so far made is perhaps disappointing—but there is no evidence at all that the problem is a hopeless one.—W. H. S.

THE BRISTOL "CHERUB" ENGINE.

Recognising the growing interest which has been taken in the subject of low-powered aircraft of, or derived from, glider types, the Bristol Aeroplane Company have for the past 15 months devoted a good deal of experiment to the production of a low-powered engine which shall have all the qualities of endurance, reliability, and economy required for aircraft work at a reasonably low weight.

These experiments have led to the production of the "Cherub," a flat-twin air-cooled engine of 1070 c.c. cylinder capacity, which after extensive tests under conditions almost exactly similar to those demanded by the Air Ministry for the larger types of aircraft engine has proved itself to be in every way a satisfactory and reliable power plant.

Two types of this engine have been designed—one with driving boss running at crankshaft speed, to be used in conjunction with a chain-driven propeller, and the other with a 2 to 1 gear reduction enclosed in the crankcase.

All the valve mechanism is entirely enclosed, ball and roller bearings are used throughout, and the lubrication is entirely automatic. The engine can be left to run for long periods at full rated power, without any attention or adjustment.

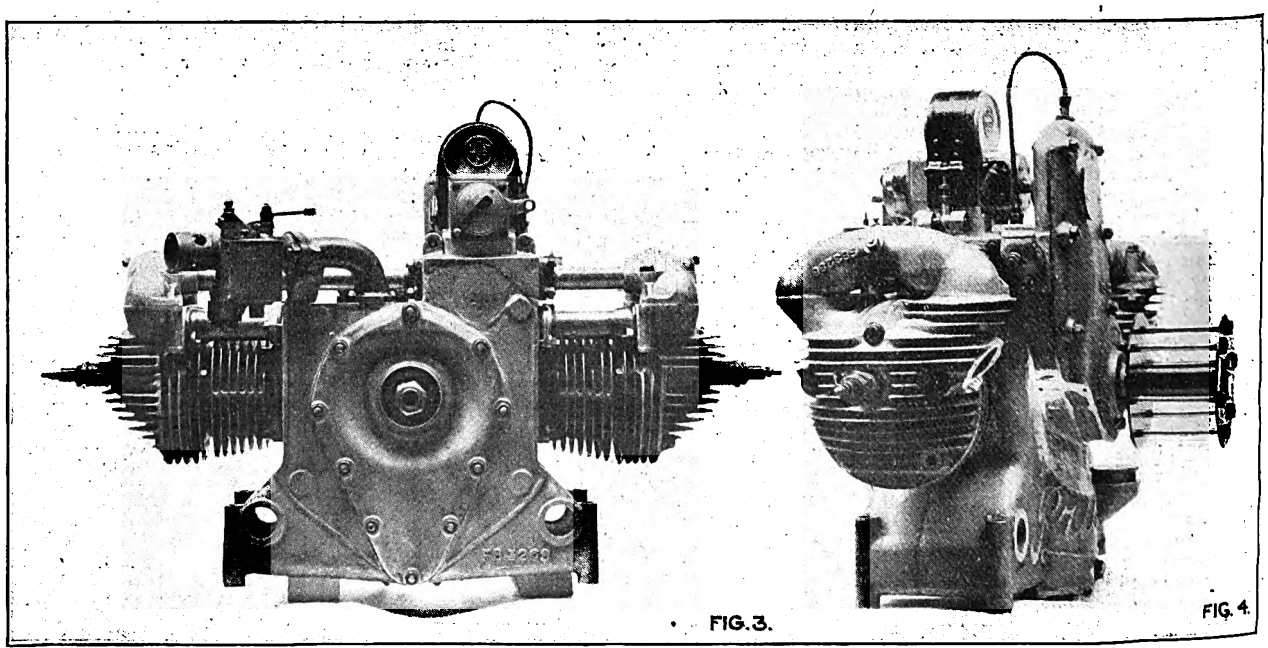

FIG. 3. FIG. 4.

The Bristol "Cherub" of 18 h.p. in rear and side view. A front view of the engine appeared in last week's issue of "The Aeroplane."

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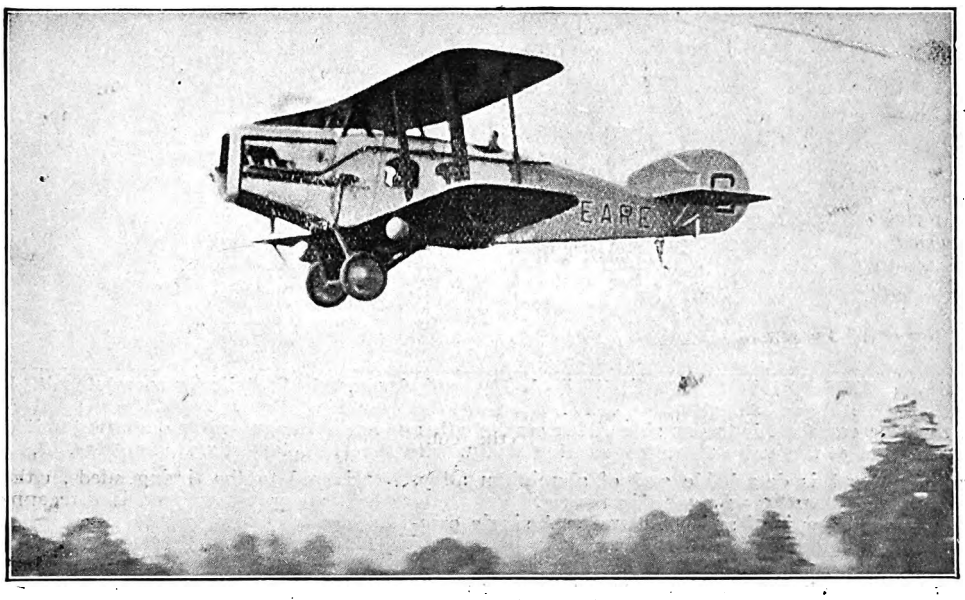

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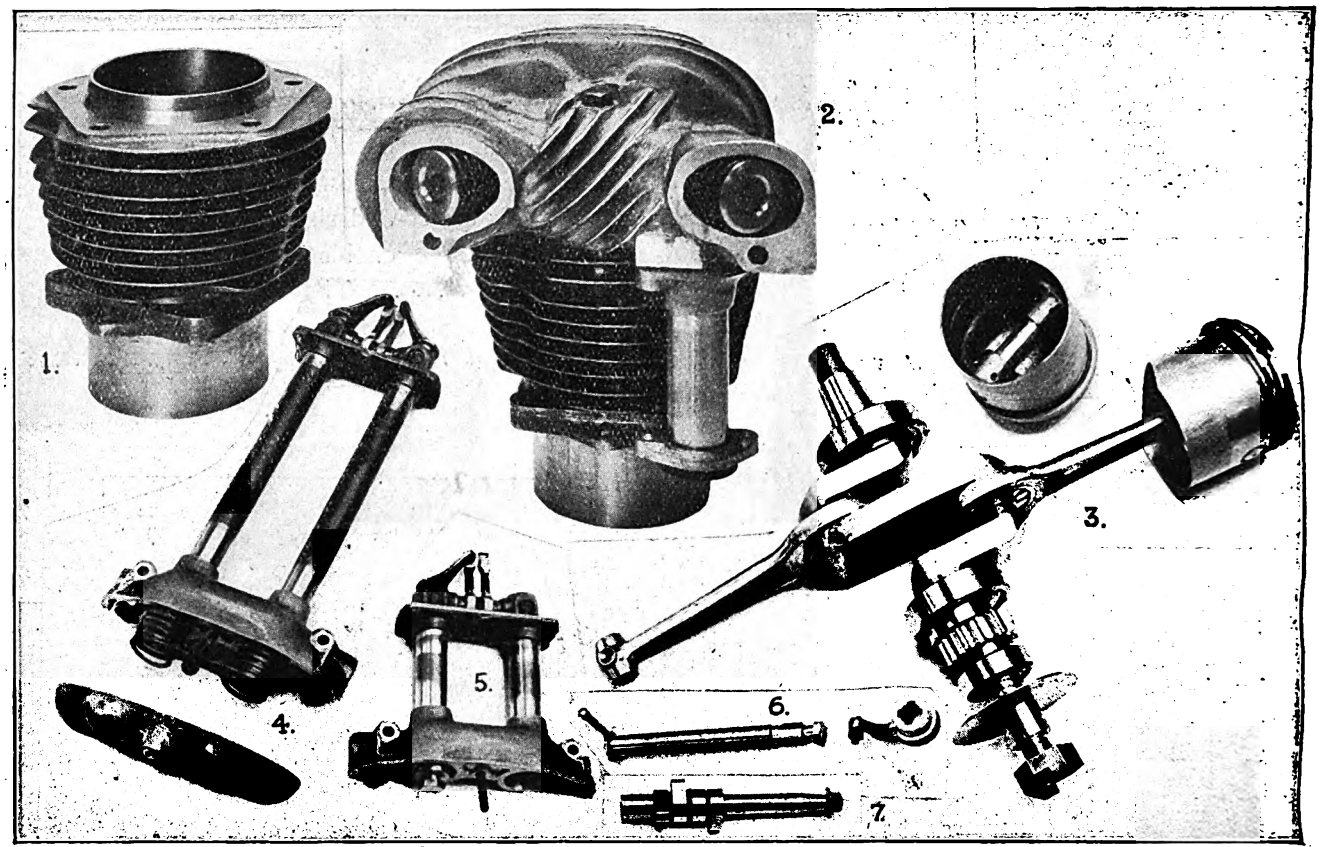

DETAILS OF THE BRISTOL "CHERUB."—1. The cylinder barrel. 2. Cylinder complete with head and valves. 3. The crankshaft connecting rod and pistons. 4 & 5. The two-valve operating gears. From the general view of the engine it will be seen that the camshaft is to one side of the crankshaft, and hence the two-valve operating units are of different lengths. 6. One of the valve-operating rocking shafts with the valve-tappet arm alongside. 7. The camshaft.

The cylinder head is detachable and of aluminium alloy, the sparking-plug bosses being bushed in bronze.

The valve mechanism is of special interest. A single camshaft with four integral cams, and driven by very robust gearing from the crankshaft, lies inside the crankcase. The cams operate fingers, which in turn operate rocking shafts enclosed in tubes; the rocking shafts are returned by coiled springs, and the mechanism is such that when the cylinders warm up there is no increased clearance between the rocking shafts and valves. Twin concentric springs are used for the Tungsten valves. The whole mechanism is enclosed and automatically lubricated, thus remaining quiet, wear does not take place, and frequent adjustment is not necessary.

The crankshaft is very stiff and robust, and is supported on three ball bearings with thrust bearing.

The connecting rods are threaded on to the crankshaft, and run on case-hardened crankpins with 7/16-in. rollers. The big end of the connecting rod has a case-hardened bush inserted. The whole crankshaft and connecting-rod assembly is of very ample proportions, and special attention has been given to the connecting-rod roller bearing assembly, so that very long life can be guaranteed.

The crankcase is a one-piece casting, arranged at the rear end with a large aperture, which provides for the connecting-rod assembly being inserted complete.

Lubrication is automatic throughout. Oil is positively delivered to the timing gears, camshaft, rocker mechanism, etc., and pressure feed is directed on to the connecting-rod assembly, from which the cylinders are lubricated by "splash." The necessary oil, approximately one gallon, is carried in the sump in the lower part of the crankcase, which floods the plunger pump. A convenient oil-filler and filter are provided.

Ignition is by B.T.H. twin-cylinder magneto, driven by gearing from the crankshaft.

Mixture is provided by a Zenith carburettor, drawing hot air from the exhaust pipe.

This engine looks a really sound practical job, which will stand up to any amount of hard wear, and give continued satisfaction.

A small production batch of these engines is now being put through the shops, and those interested in this type of engine should send their inquiries to the Bristol Aeroplane Company Ltd., Filton, Bristol.

The following are the main details of the engine :—

Bore	85 m/m.
Stroke	94 m/m.
R.A.C. Rating	8.95 B.H.P.
Rated H.P.	18 at 2,500 R.P.M.
Weight of Engine complete	85 lbs.
Petrol Consumption per hour	12 pints.
Oil Consumption per hour	½ pint.

The De H.9a ("Eagle" Rolls-Royce 360 h.p.) equipped with Lamblin radiators by the Aircraft Disposals Co. Ltd., which took part in the recent Spanish contest for Military Aeroplanes.

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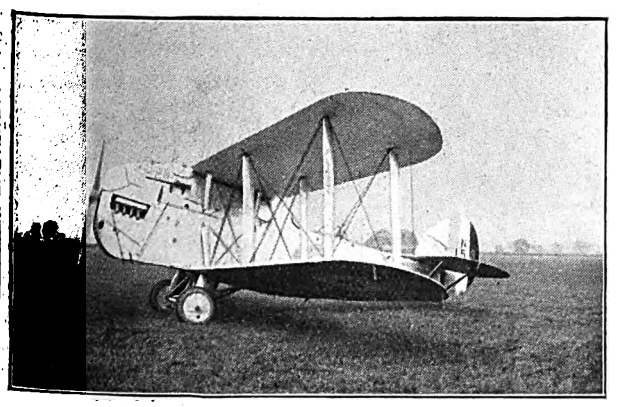

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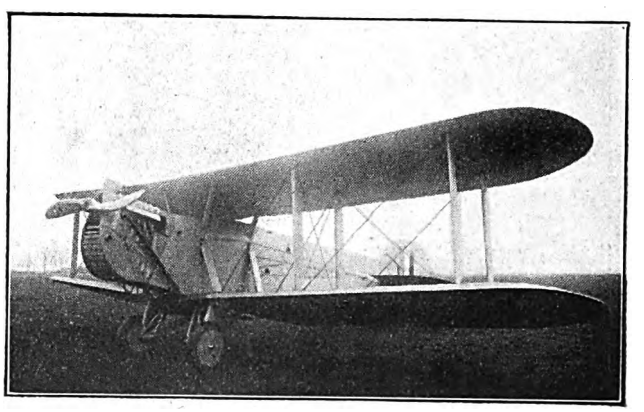

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THE I.Ae.E.

The Annual Meeting of the Institution of Aeronautical Engineers will be held on Friday, Mar. 9, at the Engineers' Club, Coventry Street. The preliminary proceedings will be followed at 7 p.m. by the Presidential Address delivered by Lt.-Col, J. T. C. Moore-Brabazon, M.C., M.P. At the conclusion of this the President will read a paper on "Aerial Photography" illustrated by lantern slides. A discussion will follow, in which any who desire are invited to join.

THE AIRCRAFT OPERATING COMPANY.

The Aircraft Operating Company has been formed for the purpose of keeping in touch with the development of aviation, particularly in the Colonies. The Chairman of the Company is Mr. Alan S. Butler, whose name is already very familiar to those who are interested in flying. He is a very keen owner-pilot and also a Director of the De Havilland Aircraft Company. Mr. Butler has been financially interested in the development of aviation in the Colonies and the experience that he has gained has prompted him to form the present Company.

Major H. Henming is the Managing-Director. He previously occupied a similar position with the Bermuda and West Atlantic Aviation Co. Ltd., and has had a great deal of experience in Colonial aviation since early 1919, when he left the Royal Air Force.

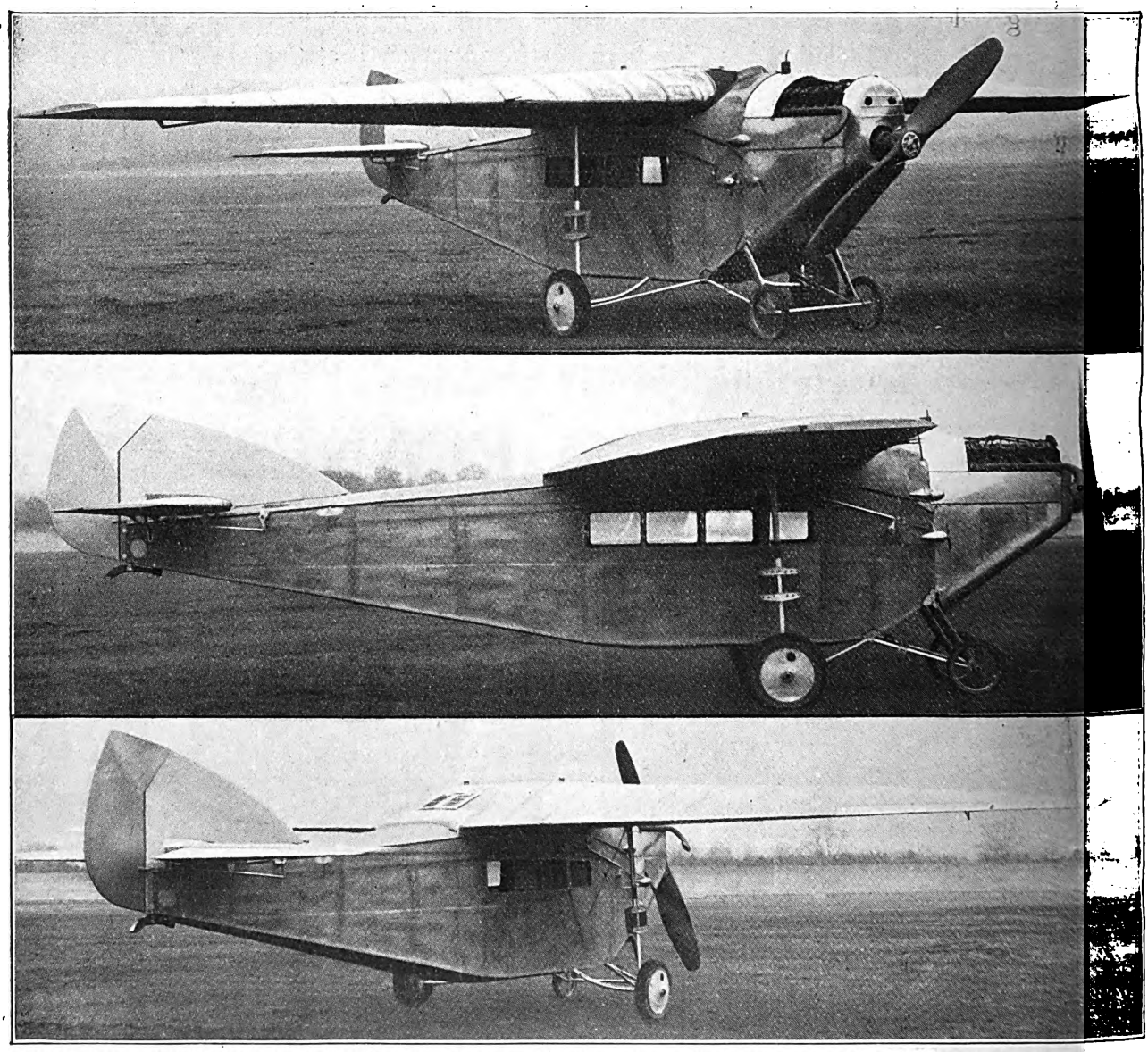
The other Director is Capt. Thomas P. Mills, a partner of Messrs. Rider, Heaton, Meredith and Mills, who are a leading firm of London solicitors in Lincoln's Inn. Capt. Mills retired from the Army some years before the War, and during the War he served again. He is a firm believer in the future of aviation and will be of very great assistance to the other Directors owing to his wide business experience.

It is not proposed to own or operate aircraft at the present and for this reason, as well as that of economy, the capital of the Company (which is £6,000) has purposely been kept low. When the Company do go in for operating aircraft they will have the necessary backing behind them.

Apart from the undoubted advantages that aircraft can provide for the carrying of passengers and mails, the Directors think that there is an immediate scope for the use of aircraft in connection with survey and exploration work. There are many parts of the Empire where it has been impossible to carry out surveys owing to the difficult nature of the country. In this case an aerial survey can be carried out far more cheaply than a land survey, and it has the added advantage of supplying a pictorial map on which the exact nature of the country is shown.

Canada has made great strides in this direction, aircraft being in daily use for surveys of timber limits and for forest fire patrol work. In fact one firm engaged on this type of work are reported to have made a considerable profit last year. Apart from other investigations the Aircraft Operating Company are now giving special attention to this class of work with a view to tendering for the carrying out of aerial surveys and exploration work generally. They have considerable data on this subject, gained from practical experience.

The Company are also prepared to advise Governments and business interests on aircraft operations generally, and their organisation enables them to act as agents for those who are contemplating the organisation of aircraft expeditions. In fact there is no doubt that they could effect considerable saving to the latter owing to their practical experience in the past.



THE NEW PASSENGER-CARRIER.—The Handasyde Monoplane (Rolls-Royce "Eagle" Engine).—To carry six passengers and pilot. The curious way in which the undercarriage is attached to the front spar of the wing is particularly to be noted. The machine was designed by Mr. G. H. Handasyde for the Larkin Company for use on an air line in Australia and was built at the works of the Air Navigation Co. Ltd. at Addlestone, near Weybridge.

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BRITISH ADC LIMITED AIRCRAFT

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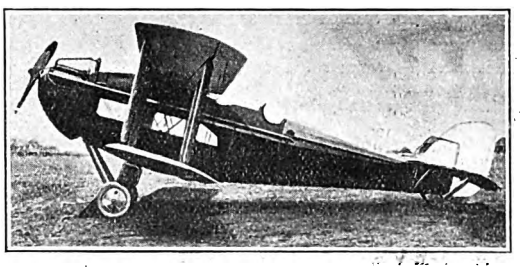
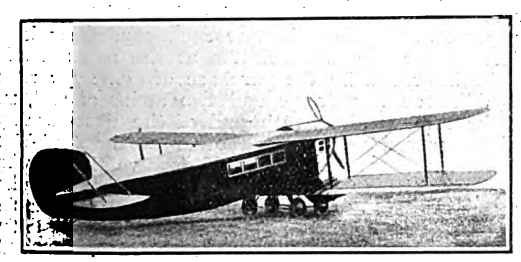
COMMERCIAL TYPES

AVAILABLE FOR EARLY DELIVERY.

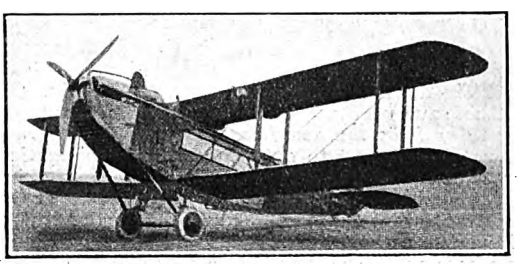
The DE HAVILLAND 18 is well known as one of the most reliable types of aircraft used on the Continental Air Lines. Capable of carrying 8 passengers, if used for such, this machine possesses the advantage of being able to alternatively carry a ton of freight.

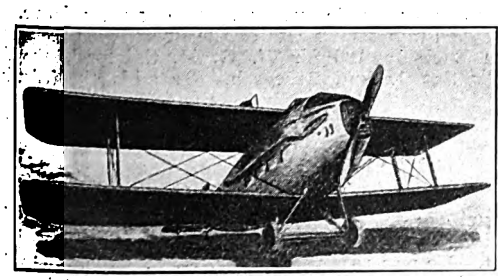




The BRISTOL 10 SEATER LIMOUSINE is an efficient and reliable passenger carrying type of machine, and has gained for itself an excellent reputation for this work.

The DE HAVILLAND 34 represents all the good points of the D.H. 18, with an increased load and speed, and greater comfort for the passengers. Accommodation: 10 passengers, or total of 2,450 lbs. freight.





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(*Continued from page 172.*)

In the course of the Debate MR. LAMBERT, who moved to reduce the Vote by £1,000, said: "Everyone will re-echo my hon. Friend's reference to the Air Officers in Iraq. It is not our custom to blame the officers. We blame the policy. If the officers are put to do an impossible job it is not fair to blame them." Later on in his speech MR. LAMBERT said: "What about the bombing of these villages we have heard something about? I should like to know. The Prime Minister said the other day there had been no bombing of villages for tax gathering, but there has been bombing of villages. May I give an instance between Basra and Baghdad quite recently, where a British Officer was shot at. I am sorry he was there. The offenders were not caught and, as I am informed upon very creditable authority, the village where these offenders came from was bombed. Is it right that your air officers should be engaged in killing women and children when the real culprits cannot be captured. It is not fair to our men to ask them to do such duty." In a further dissertation MR. LAMBERT said: "What I object to is that we have such a large Air Force in Iraq. They would be better at home. We are not well defended at home by air. The other day I quoted from the *Daily Mail* and the *Times* and the *Express* and I was jeered at. Now I will quote from the *Morning Post*. This is what General Sir William Robertson says, writing in the *Morning Post* to-day:—

> 'The Iraq Command has nearly 100 officers. The same Command has eight Air Service squadrons, or more than the whole of India.'
>
> 'We are not well defended in the air at home,' etc., etc."

MR. WALLHEAD also quoted from Sir Percival Phillips' pamphlet with regard to the alleged bombing of Arab villages.

THE SECRETARY OF STATE FOR AIR (SIR SAMUEL HOARE) then rose to reply to these accusations. In the course of his speech he said that he had been very carefully into the question suggested by the RIGHT HON. MEMBER FOR SOUTH MOLTON (MR. LAMBERT) that the use of the air arm in Iraq was not a job for the officers of the Royal Air Force, and he had sifted as deeply as he could the charges that have been made and added: "I am justified in making a complete denial of the kind of charge the right hon. gentleman has suggested. I believe that if any hon. Member looked impartially at the records of the R.A.F. since the air power took control last November, he would find that the air operations had been extremely humane and that the number of casualties had been almost insignificant. I can conceive hon. Members who do not know really what is happening believing that these raids are undertaken by irresponsible junior officers of the R.A.F. Nothing of the kind takes place. No air operation of any kind is undertaken without a definite request from the civil authority. I am informed that the ordinary procedure is that the local civil representative makes application in writing to the Officer Commanding the Air Force. The request is referred to the British Adviser at the Ministry of Home Affairs in Baghdad and after it has been carefully inquired into the Air Officer Commanding is requested by the High Commissioner to undertake them.

SIR S. HOARE also said that bombing raids are not made either to gather revenue or punish tribes for not having paid taxes. It has been found that where trouble has been stirred up by Turkish agents it has been enough to send aeroplanes over the district to drop messages of warning. Sometimes it has been necessary to drop bombs, but never in connection with revenue.

With regard to SIR R. HUTCHISON'S question about the safety of the British Garrison in Iraq, SIR S. HOARE said that so long as peace had not been made with Turkey he was unable to describe the disposition of the military forces in Iraq but he assured the questioner that the Air Staff is quite satisfied that our military dispositions are wise and secure. He added that he wished to tell the Committee how splendidly the Air Command is carrying out its duties there and that until peace is made with Turkey and the Government order the withdrawal of British troops from Iraq, as Secretary of State for Air he would give the Air Officer Commanding in Iraq every support that he could. The A.O.C. is carrying out his duties under considerable difficulties and any hon. Members who will look back to what has happened since the Air Force took over command last November will say that this first experiment that we have made as regards an independent Air Command has so far answered very well, and is an experiment that the House of Commons ought to follow with every sympathy.

After a lot more talk by people fairly well informed, less well informed and without any information or intelligence at all, the amendment was defeated by 269 votes to 153.

THE DEVELOPMENT OF CROYDON AERODROME.

The Civil Aviation Advisory Board which was appointed last year to consider and inquire into the practicability and cost of increasing the Aerodrome facilities of London, with special reference to the convenience to the business centres of the City, issued its report on Mar. 2.

The Board was guided in its considerations by the importance attached to matters other than those of proximity to the business centres of the City. The first consideration was the size of the aerodrome and the length of run in all directions but particularly in the South-West direction and the level surface of this site. It estimated that with the present classes of commercial aircraft the clear run in any direction should not be less than 1,000 yards.

The next most important consideration was that the aerodrome selected should be as free as possible from the fog and mist with which all the Thames Valley is troubled. It also considered that as the saving in time increases in direct proportion to the length of the air journey the length of flight will in the near future increase considerably. For this reason the saving of a few minutes on the road or train journey to or from the aerodrome, while deserving attention should not be allowed to outweigh other considerations.

Four special points were considered:—(a) The improvement of the existing London Terminal Aerodrome at Croydon. (b) The transference of the London Terminal Aerodrome to one of the other of the existing aerodromes near London. (c) The purchase and development of a new site. (d) The roofing over of a large railway terminus in London for use as an aerodrome.

The aerodromes near London, other than Croydon, that were considered are Cricklewood and Hendon. For various reasons they are unsuitable for the main aerodrome but should be kept with a view to using them as reserve aerodromes. Of the twelve alternative new sites which were examined the two which appeared to require special consideration were Gunnersbury Park and Wormwood Scrubbs.

Gunnersbury Park has excellent communications and is within about 30 minutes by road of Charing Cross. The present communications will be further improved when the scheme of arterial roads has been carried out. The preparation of the site which is about 200 acres in extent and nearly level, or, with the purchase of additional land South of the park, about 230 acres, would involve the removal of a large number of trees, the filling up of a pond and the levelling of a small ridge in the middle of the park. The cost of this work plus the necessary buildings was estimated approximately to be £350,000 and with the purchase of the land the scheme would cost about half-a-million pounds in capital expenditure. Its most serious disadvantage is its proximity to the river and consequently its tendency to river mist.

Wormwood Scrubbs is War Office property administered by the London County Council. The site is rather small and the adjoining land might be difficult and would be expensive.

With regard to the proposal for roofing over one of the large London railway termini, the length of run so provided would, with the existing type of aircraft, be insufficient and the cost would be prohibitive. The Board consider that this may be a reasonable proposition in the distant future.

The proposal to improve the present Croydon aerodrome is considered to be the best solution at the moment. The site could be improved by the purchase of some 75 acres of the old Beddington Aerodrome and two strips of land, one adjoining the road at the South end of the East boundary of the existing aerodrome and the other at the South-West corner of the aerodrome. This would involve the diversion of Plough Lane, the provision of additional accommodation and the reorganisation of the existing accommodation on the aerodrome. A new main arterial road from London to the vicinity of the aerodrome should be considered. The total cost of these improvements is estimated to be £225,000.

In conclusion the Board stated that having regard to all the considerations involved they can find no sufficient advantages to warrant them in recommending the abandonment of the Croydon aerodrome.

They accordingly recommended that (a) The Croydon Aerodrome should be retained as the London Terminal Aerodrome. (b) The aerodrome should be enlarged and improved on the lines indicated. (c) A total sum not exceeding £250,000 should be voted for the purpose. (d) Any necessary legislation should be promoted and the alterations put in hand and carried through without delay. (e) Particular attention should be directed to the advantage of selecting for road development those routes which might improve the road communications between London and Croydon. (f) The necessary steps should be taken to acquire the Gunnersbury Park site with a view to its possible eventual use as an aerodrome.

This is signed by all members of the Board with the exception of Air Vice-Marshal Sir W. G. H. Salmond, the Air Member for Supply and Research. He adds the following report:—"I sign the Report with the following proviso to be added to recommendation (f):—'Provided funds are available, and subject to recommendations (a) to (e) being first carried out.'"

AN OFFICIAL VISIT.

Sir Samuel Hoare, Secretary of State for Air, paid a visit of inspection to the works of D. Napier and Son Ltd. on Friday last. He was received by Mr. H. T. Vane, C.B.E., the managing director and saw the 450 h.p. Napier "Lion" and the 1,000 h.p. "Cub" in process of construction.

AN INTERNATIONAL CUP.

One learns that Mr. Beaumont an American citizen has intimated to the F.A.I. his willingness to present a trophy and monetary prize to replace the Gordon Bennett and Deutsch Cups. He suggests that nations entering for the first race should ballot for the privilege of holding it in their respective countries but afterwards it should be held in the country of the holder.

Mr. Beaumont, formerly Schonberg, made a fortune out of his stores in Kansas City, U.S.A., and has long been resident in Paris where he is generally entitled "Commodore" Beaumont.

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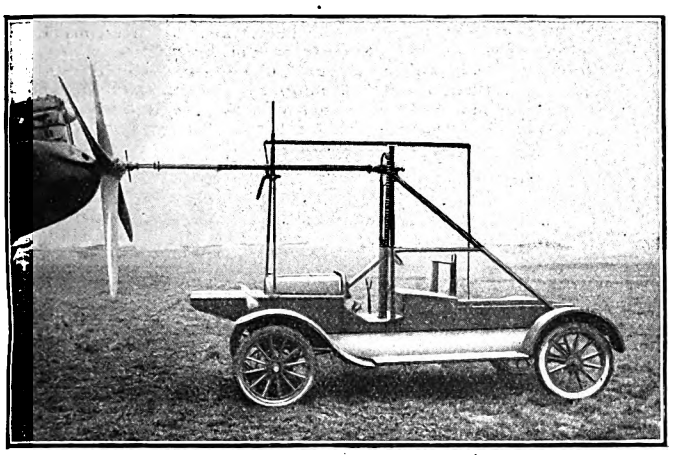

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Aircraft Engines

The "LYNX"
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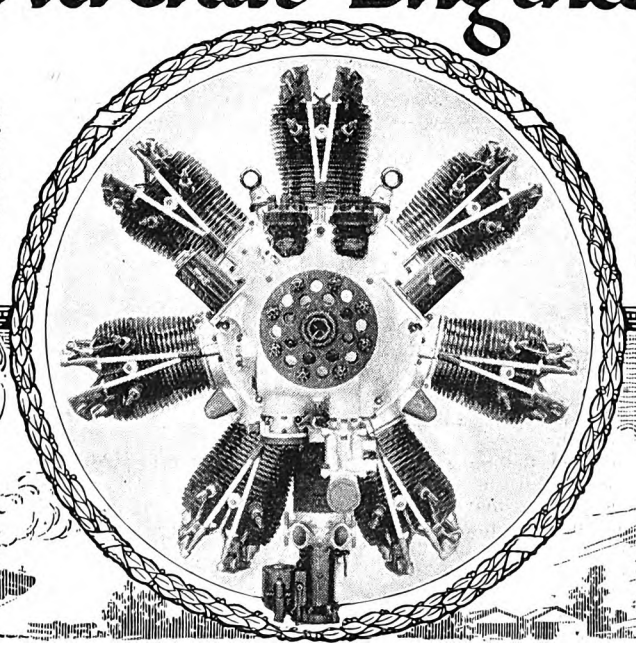
gives 175 h.p. at 1,700 revolutions. Its chief characteristics are low petrol and oil consumption and perfect cooling.



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R.A.F. INTELLIGENCE.

Appointments.

Air Ministry, Feb. 27.

General Duties Branch.—S/Ldrs. P. A. Shepherd, from H.M.S. "Ark Royal," Mediterranean, to R.A.F. Depot (Supernumerary), 4/2; J. B. Graham, M.C., A.F.C., from No. 1 Squadron, Iraq Command, to R.A.F. Depot (Supernumerary), 14/1; C. C. Durston, from H.Q., R.A.F., India, to R.A.F. Depot (Supernumerary), 19/1; A. J. Miley, O.B.E., from No. 267 Squadron, Mediterranean, to H.M.S. "Ark Royal," to command R.A.F. Unit, 19/2.

F/Lts. H. W. G. Jones, M.C., from R.A.F. Depot to R.A.F. Cadet College, Flying Wing, Cranwell, 23/2; V. S. E. Lindop, from No. 28 Squadron, India, to R.A.F. Depot (Supernumerary), 19/1; A. F. Brooke, from R.A.F. Depot to Boys' Wing, Cranwell, 26/2; E. Drudge, M.B.E., from R.A.F. Depot to School of Photography, 22/2; R. A. Young, from R.A.F. Depot to School of T.T. (Men), 26/2; F. J. Cooke, from No. 1 School of T.T. (Boys), Halton, to No. 1 Stores Depot, Kidbrooke, 1/3; W. R. Fairbairn, from R.A.F. Depot to No 1 School of T.T. (Boys), Halton, 26/2.

Medical Branch.—F/Lts. P. C. Livingston, D.P.H., from R.A.F. Central Hospital to Central Medical Board, 19/2; C. Y. Roberts, from H.Q., R.A.F., India, to No. 60 Squadron, India, 28/1.

Accountant Officers.—S/Ldr. H. G. Jones, from School of Photography to R.A.F. Depot, 22/1.

Air Ministry, Mar. 2.

General Duties Branch.—Group/Capts. A. Fletcher, C.M.G., C.B.E., M.C., from Aircraft Depot, Iraq, to H.Q., Iraq (Supernumerary), 20/12; H. J. D. Boyle, C.B.E., D.S.O., from H.Q., Iraq Command, to Station Commandant, Iraq, for duty as Commandant, 1/10.

Col. (Temp. Col. Commandant) E. W. Costello, V.C., C.M.G., C.V.O., D.S.O., as Colonel Commanding Troops, Palestine, on attachment to R.A.F., on appointment to command Palestine Brigade, 15/6.

Wing/Cmdr. W. C. Hicks, A.F.C., from H.Q., Iraq Command, to command Aircraft Depot, Iraq, 20/12.

S/Ldrs. J. Kemper, M.B.E., from No. 4 F.T.S., M.E., to Basrah Group H.Q., 5/1 (substituted for the entry which appeared 31/1); F. G. D. Hards, D.S.C., D.F.C., from H.Q., Iraq Command, to Station Commandant, Iraq, 1/10.

F/Lts. R. D. Oxland, from H.Q., Iraq, to H.Q., R.A.F., Middle East, 14/1; T. H. McDowell, from H.Q., R.A.F., India, to Aircraft Depot, Iraq, 5/1; R. F. L. Dickey, D.S.C., from School of Naval Co-operation and Aerial Navigation to No. 45 Sqdn., Iraq, for duty as Adjutant, 13/12 (substituted for the notification dated 20/12); I. M. Matheson, from Armament and Gunnery School to No. 45 Sqdn., Iraq, 13/12 (substituted for the notification dated 20/12); G. Y. Tyrrell, M.C., from No 30 Sqdn., Iraq Command, to H.Q., Iraq, 26/1; F. H. Laurence, M.C., from R.A.F. Depot to No. 2 F.T.S., 23/2; H. P. Lale, D.S.O., D.F.C., from School of T.T. (Men) to No. 24 Sqdn, 23/2; C. Bounphrey, D.F.C., from R.A.F. Base, Gosport, No. 3 Sqdn., to Seaplane Training School, 15/3; H. W. Woollett, D.S.O., M.C., from Stores Depot, Iraq, to Mechanical Transport Workshops and Pool, Palestine, for duty as Adjutant, 14/1.

Medical Branch.—S/Ldr. R. H. Knowles, M.D., D.P.H., from H.Q., Iraq to R.A.F. Depot (Supernumerary), 14/1.

Accountant Officers.—F/Lt. W. R. Westcombe, from R.A.F. Depot to M.T. Repair Depot, 13/2.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

The R.A.F. Association Football Cup.

Draw for the 5th Round :—Cranwell "B" v. Leuchars; Shotwick v. Shrewsbury; Eastchurch v. Manston; Halton v. Winchester.

The 5th round to be completed not later that Mar. 28. Results to be forwarded to Hon. Sec. by both teams. To be played on the ground of the first-named team. Extra time to be played in the case of a draw. Dates of fixtures to be forwarded to F/O. A. E. Simmonds, R.A.F., Halton, Hon. Sec. of the R.A.F. Referees' Committee fourteen days before the match in order that he may appoint referees.

Halton.

4th Round, R.A.F. Cup :—The 4th round of the R.A.F. Cup between No. 2 Section and No. 4 Section Halton was played at Wendover on Feb. 21 resulting in a draw after extra time, no goals being scored. The replay took place at the week-end on the Station Sports Ground, No. 4 Section winning after an exciting game by 3 goals to 2.

Cranwell.

The results for the past month are as follows :—

BOYS' WING—Rugby :—Newark 2nd XV (won 8—0); Stamford Grammar School (lost 3—6); Newark Grammar School (lost 0—26).

Hockey :—Stamford (won 5—2); Boston 2nd XI (won 3—1).

STATION—Rugby XV :—Lincoln (drawn 0—0). 2nd round R.A.F. Cup replay—Spittlegate (lost 0—6).

STATION ASSOCIATION LEAGUE :—*R.A.F. Cup*—4th round : Duxford (won 7—1); *Lincolnshire Junior Cup—Semi-final* : Cleethorpes (won 3—1); *Soames Cup—2nd round* : Kirton (won 5—1); *Lincoln Wednesday League* : Lincolnians (won 6—0).

R.A.F. (CADET) COLLEGE—Hockey XI :—Sleaford (won 2—0); R.A.F. Cranwell (lost 0—2); Oundle School (won 4—0).

STATION—Hockey XI :—R.A.F. Cup—Shrewsbury (won 3—1); Boston (won 3—1); Cadets (won 2—0).

On Feb. 24 an athletic match was held by the Cadet College and Queen's College Cambridge, resulting in a win for the latter by 10 pts. to 0.

Stores Depot, Egypt.

Football.—G.P.O. (drawn 1—1 and won 2—1). Semi-final Middle-East Cup : Aircraft Depot (lost 0—2).

Friendly Matches.—Amateur Athletic Club (won 3—0); Atlas F.C. (won 6—0); R.A.F. Zone XI (2) H.M.S. *Ajax* (1). 1st round Carver Haseldene Cup : H.Q. Company, E. Yorks Regt. (lost 2—4).

Hockey.—East Yorks (won 7—2).

Boxing :—The Stores Depot was well represented in the recent Middle-East Championship which was held at the end of Jan. AC. Howell beat AC. Pike (Aircraft Depot) on points in the first round but was beaten in a similar decision in the semi-final by AC. Meredith (E.R.D.). In the feathers AC. Williams (after beating AC. Agnew on points in the semi-final) knocked out AC. Harris (47 Sen.) in the 3rd round of the final.

[Note.—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* The Aeroplane *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*]

Inter-Services Rugby.

(Unofficial.)

At first sight it may appear that the R.A.F. having beaten the R.N. and the R.N. having beaten the Army the R.A.F. will have a soft job when they meet the Army at Aldershot on March 10. This is not an accusation of over-confidence, it is merely a mild warning. As a matter of points alone it should be remembered that the Army scored 8 points in the first half of last Saturday's match to the Navy's 3.

The Navy are known to be a fine-weather side and against the Army were at the very top of their form. The Army put up a very fine show indeed at Twickenham. Their scrimmaging was good, they have a fine pair of halves and in Q.M.E.A. King on the wing they have a three-quarter with a good turn of speed whom it will take the best Air Force tackling to bring down. Middleton the Army full-back combines great speed with sure fielding and a terrific length kick. Altogether a side to be treated with great respect.—C. M. MCA.

PERSONAL NOTICES.

Death.

GASKELL-BLACKBURN.—On Feb. 26, 1923, in Edinburgh, Maria Idalian (Ida), wife of S/Ldr. Vivian Gaskell-Blackburn, R.A.F., D.S.C., A.F.C.

Births.

BARRACLOUGH.—On February 9th, at Grantham, to Esther, wife of F/O. C. E. Barraclough, R.A.F.—a son.

COURTNEY.—On February 21st, at 4, Granville Terrace, Littlehampton, the wife of Wing/Cmdr. Ivor T. Courtney, C.B.E., R.A.F.—a daughter.

CUMMINGS.—On Feb. 25, wife of F/Lt. P. H. Cummings, D.F.C., R.A.F.—a son.

FFISKE.—On February 19th, at Hillside, Brundall, Norfolk, to Ethel, the wife of Mr. Geoffrey ffiske—a son.

HARRIS.—On Feb. 20, at 5, Harrington Gardens, S.W., the wife of S/Ldr. A. T. Harris, R.A.F.—a daughter.

KIDDY.—On Feb. 28, at 27, Hamlet Gardens, W.6, to Dorothy, wife of Capt. M. G. Kiddy—a son.

MAUND.—On Feb. 26, to Marguerite (née Hill), wife of S/Ldr. A. C. Maund, C.B.E., D.S.O., R.A.F., Peshawar, India—a daughter.

POOLE.—On February 1st, to Dorothy, wife of F/O. C. J. Poole, R.A.F., Abu Sueir, Egypt—a daughter.

RAPER.—On Mar. 5, at 48, Beaufort Gardens, to Mr. and Mrs. A. Baldwin Raper—a son.

Marriages.

OWLES—FERRIER.—On Jan. 9, at Ruiru Church, Kenya Colony, Ernest Trafford Owles (late R.F.C.), son of Harry George Owles, of Hutton, Essex, to Isabella Sophie Ferrier, daughter of the Rev. Alexander Ferrier, of St. Andrews, Fife.

OLLEY—OLLEY.—On Feb. 19, at St. George's, Hanover Square, Gordon Percy Olley, late R.A.F., to Violet Ellen Olley, of 173, Unthank Road, Norwich.

[Mr. Gordon Olley is the well-known Handley Page pilot who broke the world's duration record for a glide with a passenger at Itford Hill in October last.]

BRITISH SCHNEIDER ENTRIES.

The Blackburn Aircraft Company are building a small fast seaplane for the Schneider Cup race in September. The machine will be fitted with a 450 h.p. Napier "Lion" engine.

A similarly engined machine will almost certainly be built by the Supermarine Aircraft Works and a Napier trio will be formed by the probable conversion of the "Bamel" to a seaplane by the Gloucestershire Aircraft Company for the event.

It is highly probable that there will also be a Fairey entry with a Napier engine.

The "Bamel" will compete as a land machine in the King's Cup Race and the Aerial Derby. Should there be a big International Race to replace the Deutsch Cup then the Gloucestershire Company may perhaps build a new Napier-engined racer.—G. D.

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On August 7th, for the second time in succession, B.T.H. Magnetos helped Mr. J. H. James to secure the Aerial Derby Trophy for First Place.

His machine—"Mars I"—The Gloucestershire Aircraft Company's biplane, popularly known as the "Bamel," has a 450 H.P. Napier Lion engine, equipped with a **B.T.H. A.V. 12 Magneto** and this year averaged 179½ m.p.h., being 16 m.p.h. better than last year.

B.T.H. Magneto Successes.

Second Place was gained by Mr. R. A. de H. Haig, flying a Bristol Bullet machine, equipped with a 440 H.P. Bristol Jupiter engine and a **B.T.H. A.V. 9 Magneto.**

Third Place was secured by Mr. F. P. Raynham, in a Martinsyde F. 6 machine, equipped with a 200 H.P. Wolseley Viper engine and a **B.T.H. A.V. 8 Magneto.**

B.T.H. Magnetos were also fitted to the machines gaining **Second, Third** and **Fourth** places in the 1922 **Aerial Derby Handicap** and to the machines gaining **First, Second** and **Third** places in the **August Open Handicap.**

This is the fourth successive Aerial Derby in which B.T.H. Magnetos have been fitted to machines gaining the First and Second places!

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THE FIRST OFFICIAL WORLD'S RECORDS

FOR MARINE AIRCRAFT

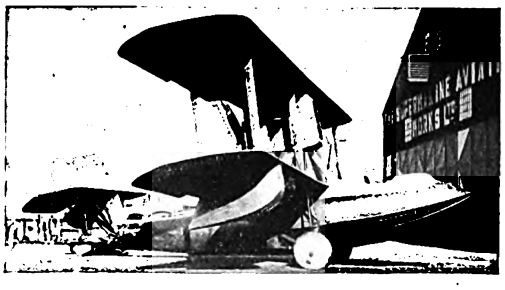
Gained [by] THE SUPERMARINE, "Sea Lion II" Single Seater Amphibian Flying Boat, when winning back for England the Schneider Cup at Naples, August, 1922.

Duration of
1 hour 34 mins. 51⅘ secs.

Longest Distance
Accomplished 230 miles.

Fastest Time for
100 Kilometres / 62 miles — 28 mins. 41⅘ secs.

Fastest Time for
200 Kilometres / 124 miles — 57 mins. 37⅖ secs.



"SEA LION II" SINGLE SEATER AMPHIBIAN, 450 h.p. Napier Lion.
Winner of the International Race for the Schneider Cup at Naples, 1922.

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Mar. 4:—

LONDON—PARIS:

Handley Page Transport, Ltd., machines 5*, passengers 37; De Havilland Aircraft Company (Night and Special Service), machines 0, passengers 0; Air Union, machines 10†, passengers 47; Total machines, 15, passengers 84.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 11*, passengers 43.

MANCHESTER—BIRMINGHAM—LONDON—AMSTERDAM:

Daimler Airway, machines 18, passengers, Manchester-Birmingham-London, 16, London-Amsterdam, 15.

LONDON—ROTTERDAM:

K.L.M., machines 9, passengers 6.

Total number of trips by British machines: 34, carrying 111 pas. Foreign machines: 19, carrying 53 pas.

Trips per day.—Monday, 0; Tuesday, 7; Wednesday, 10; Thursday, 10; Friday, 11; Saturday, 15; Sunday, 0.

STATISTICS.

Machines, 53; Passengers, 164; Crews, 102; Total Personnel, 266.

Corresponding week last year:—

Machines, 45; Passengers, 81; Crews, 74; Total Personnel, 155.

Corresponding week, 1921:—

Machines, 30; Passengers, 32, Crews, 38; Total Personnel, 70.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

The number of passengers is steadily on the increase and with the exception of Monday which owing to weather was a blank day most of the scheduled machines got through.

The Air Union is now going well and last week they beat Handley Page Transport in the number of passengers carried. One can scarcely show surprise in this seeing that they are "full out" for propaganda and make full use of opportunities offered to them, a fact which H.P.T. might note to their advantage.

Some English people who came over last week by "Goliath" and who had hitherto only travelled by Handley Page informed one that they considered the "Goliath" in every way the equal of the Handley Page. Which of course may be only a matter of non-technical opinion, but is at any rate of importance from a propagandist point of view. This state of affairs is largely due to the sound business sense of the joint London managers of the Air Union, Messrs. Grosfils and Hyatt.

The passengers carried by the Instone and Daimler people are becoming more numerous and it seems that this year, which will probably be the last under the subsidy scheme, there will be a good number of passengers and the new scheme will come into operation with the commercial lines at any rate paying their direct running costs.

The Aircraft Disposal Company had a comparatively quiet week in the air, though they are still busy in the shops. The only flight made was by Capt. Stocken who on Friday tested a "Tinsyde."

Mr. Hubert Broad made some night test flights in the neighbourhood of the aerodrome on Saturday on a D.H.9.

Mr. Muir has been joy-riding on most days of the week with his Avro.—G. D.

ANOTHER WARNING TO THE AIR MINISTRY.

Apropos a short paragraph which appeared in THE AEROPLANE last week one of our most competent aircraft designers writes: "I think your note headed 'A Warning to the Air Ministry' in this week's AEROPLANE is very good and well-timed. I feel I would like to fill pages with similar notes. It is getting past a joke and it is nearly impossible to make good aeroplanes."

AMERICA AND THE GOTHENBURG SHOW.

In connection with the forthcoming Gothenburg Aero Exhibition it is now announced that Maj.-Gen. Mason M. Patrick, Chief of the U.S. Army Air Service, has already advised that Major B. D. Foulois, Air Assistant to the U.S. Military Attaché in Berlin, will be authorised to attend the exhibition.

The U.S. Post Office Department is preparing an exhibit, and both the War and Navy Departments are interested and it is highly probable that a combined exhibit may be prepared that will be transported to Gothenburg on a battleship or other Government vessel.

AERO G. S. WINTER MEETING.

The Winter Meeting of the Aero Golfing Society, which is run from the Royal Aero Club, took place at Richmond Golf Club, Sudbrook Park, on Feb. 28.

The Aero Golfing Society Challenge Cup (presented by Sir Samuel Instone). Winner Air Vice-Marshal A. V. Vyvyan 88 less 12 = 76; Runner-up Sir Henry White Smith 96 less 15 = 81.

Other returns: A. J. A. W. Barr 82. Lt.-Col. F. C. Shelmerdine 83. L. V. Pearkes 84. E. N. Clifton 84. H. E. Perrin 87. Lt.-Col. J. T. C. Moore Brabazon 87. K. Rankin 87.

Bogey Foursomes: Lt.-Col. F. C. Shelmerdine and F/0. F. C. Fitzgibbon 4 down; H. E. Perrin and J. Macdonald 5 down; A. J. A. W. Barr and E. N. Clifton 5 down.

AN AMERICAN SEARCH FOR A GLIDING CENTRE.

The National Aeronautic Association of the United States—which aspires to control the sporting side of aviation in the U.S.—is engaged in seeking for a suitable locality for holding gliding and soaring contests.

For this reason it invites all those who are interested in this subject to supply descriptions of any grounds which appear to them to be suitable, and to guide its correspondents it has issued a statement of the *desiderata* for such a ground—which reads as follows:—

DESCRIPTION OF TERRAIN SUITABLE FOR HOLDING GLIDER AND SOARING CONTESTS.

Terrain.—A long ridge is preferred rather than a detached-shaped hill.

Slope.—The slope must face the direction of the prevailing wind, and should be reasonably uniform and of proper magnitude. The slope should be approximately one in four near the top of the hill, decreasing to one in six or eight a short distance below the top. A constant degree of slope, however, would be satisfactory, even if it is nowhere in excess of one in six. The hill should not be conical, but should have a side broad and flat or somewhat concave in form as viewed from above. An ideal condition would be a sloping valley facing the prevailing wind, wide and open at one end and contracting gradually between two ranges of hills until finally completely closed off at the other end by the hill from which the flights would be started. Such a valley would, however, not only have to face the prevailing wind but no gliding could be done with any wind from any other direction. An open range of hills would have the advantage of allowing a certain deviation of the wind direction.

Height.—A total drop of 1,000 ft. from the hill to the plain below is highly desirable. A minimum height of 100 ft. is the least that could be considered. The nearer the base of the hill approaches absolute sea-level height the better.

Surface.—The surface must be smooth and as free as possible from trees, shrubbery, telephone wires and other obstructions. A small plateau on the top is highly desirable.

Location.—In parts of the country where the required velocity of the wind during the hours that the contest is to take place occurs at not infrequent intervals. A mere daily average is not sufficient

Wind Velocity.—The wind should be of more than 15-miles velocity, preferably of 20 or 25 miles an hour continuously for hours at a time.

Accessibility.—The hill should be accessible by good roads and car lines for the benefit of spectators and contestants.

It is obvious that the National Aeronautic Association proposes to leave as little as possible to chance. The specification given corresponds roughly to that of the range from Itford to Firle Beacon, enlarged to the scale of the Wasserkuppe, with a guarantee of wind conditions such as were attained at Itford during the *Daily Mail* Competition.

If they discover a position conforming to their requirements there can be little doubt that all the gliding records will forthwith emigrate to the United States.

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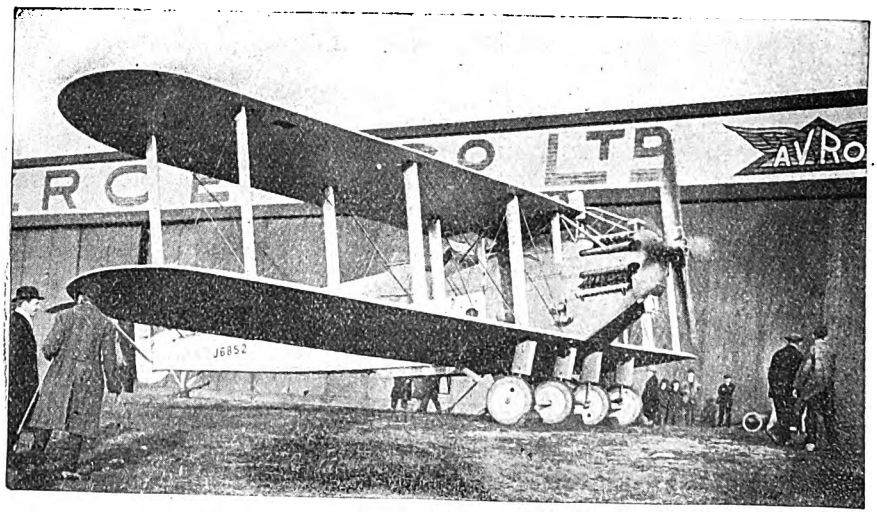
AVRO LEADS AGAIN!



THE machine illustrated is the 1000 h.p. Avro-Napier Bomber, which was successfully taken into the air in December last.

It is the most powerful single-engined aeroplane in the world and was designed and constructed by A. V. ROE & CO. LTD., of Manchester, London, and Southampton.

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THE 1000 h.p. Avro-Napier Bomber, which has proved so successful in flight, marks another step forward in Aviation. Never before has a machine with such a high-powered engine taken the air successfully. It is significant that this aeroplane was designed and constructed by A. V. ROE & CO. LTD., and it is a great tribute to their organisation and resources.

This Bomber is a further development of the AVRO "Aldershot," which won the Air Force Handicap at the last R.A.F. Pageant. It is fitted with dual control, and the whole of it, with the exception of certain parts of the wings, is constructed of metal. The wings are designed to fold back so as to economise space when the machine has to be stored.

A. V. ROE & CO. LTD. invite inquiries for information concerning the building of machines for special purposes, or for the supply of AVRO standard aeroplanes or seaplanes.

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MAR. 14. 1923.

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ON THE AIR FORCE, THE ESTIMATES AND THE NAVY.

On Mar. 8 the Estimates for the Navy and Air Force were "Presented to Parliament by Command of His Majesty." From the point of view of the Air Force they might almost be described as satisfactory—as indicating what Parliament and the Nation must expect in the future in accord with Captain Guest's remark last year as to the steadily growing increase of expenditure on Air Power. From the point of view of the Navy these estimates must be pure concentrated gall and wormwood. For the Navy is docked of £7,000,000 and its hitherto despised rival is given an increase of £1,116,000.

The net total of the Naval Estimates is the huge sum of £58,000,000, which seems uncommonly generous for a Service whose effectiveness and efficiency are both obviously decaying and whose methods and material however much they may change are in any case obsolescent. On the other hand the net total of the Air Force Estimates is only £12,011,000, which is a miserably poor ration for a Service which is our First Line of Defence at home and our First Line of Attack abroad—in fact the King's Premier Service. Nevertheless, when one recognises the fact that Parliament and the Press always think some years behind the more intelligent people of this country the relative decreases and increases are not unsatisfactory.

And it must be remembered that the actual figures are prepared by permanent officers and officials who naturally claim all they can hope to get and are checked by Treasury officials who knock off every penny which they can hope to deduct. Thus we arrive at something very like a just expenditure of public money, except under a crazy Ministry like that of Mr. Lloyd George where the sound sense of the permanent officials is overborne by Cabinet pressure in the effort to pander to popular feeling and thus acquire votes.

The last General Election and the present Estimates show that commonsense is again prevailing, despite the results of recent bye-elections in which a fit of political apathy on the part of busy Conservative money-earners unfortunately coincided with an attack of rancour against the Government on the part of certain newspaper proprietors who apparently do not like losing the Cabinet-making power which they held in the Lloyd George period. The few weak-minded voters who were turned Bolshie by misleading articles in these newspapers were numerous enough to unseat some very decent minor Cabinet Ministers, but they do not represent the feeling of the Nation which in all classes is to-day more Conservative than it has been for twenty or thirty years. And it is the most Conservative, because the most intelligent, people of the country who understand best that the Air Force is the most important of the King's Armed Services.

Another Naval Attack.

Naturally the Estimates have coincided with a violent renewal of the Admiralty's attack on the Air Force in a despairing effort to get the Naval side of the R.A.F. back as an integral part of the Navy. The leader of the Naval die-hards in the House of Commons, Viscount Curzon the eldest son of Earl Howe, has been asking question after question (too numerous to quote in the limited space now available in this paper) about a Committee which was to be set up some time ago to consider the relations of the Air Force to the other Services.

Mr. Bonar Law has stated that this Committee is the Committee of Imperial Defence to which other names (presumably the Chiefs of the Navy, Army and Air Force among them) have been added. He refused to state the names of the Committee and refused to lay its report before the House and refused to guarantee that no changes would be made without getting the direct assent of the House of Commons. This last refusal was on the good grounds that "there is just the possibility that the Committee may report when the House is not sitting."

In the course of these questions and in the First Lord's statement explanatory of the Navy Estimates it was disclosed that "140 officers and 1,000 men" who ought to have been demobilised from the Navy, or "axed" as the current phrase has it, according to Government orders are being retained "in anticipation of a decision of His Majesty's Government empowering the Admiralty to man with Naval personnel the Air Arm of the Fleet." It seems that the Admiralty already knows what is to happen. But if this anticipation should prove to be merely an expectation and an incorrect one at that it strikes one that this is a case of gross insubordination on the part of the Board of Admiralty, who after all are subordinate to His Majesty's Government. And it makes it necessary before proceeding to the study of the Air Estimates to discuss the relations between the Navy and the Air Force.

The Navy's Failure.

One has been told by several good friends in the Air Force that the attitude of this paper towards the Navy is not conducive to cordial co-operation between the two Services and that in attacking the Navy one displays prejudice. As to the matter of prejudice one would like to state that one has had many more relatives and personal friends in the Navy than in the Army and that if one had any prejudices they would be in favour of the Navy. The fact is that one's feelings and statements are judicial and not prejudicial. It is because at the beginning of the War 1914-18 one had such strong beliefs in the effectiveness of the Navy and during the war saw all those beliefs shattered by the stupidity of the senior officers of the Navy that one is now convinced that the only hope for the future of the British Empire in war is to relegate the Navy to a minimal position of responsibility and to depend for offence and defence on the initiative and efficiency of the Air Force.

There is no space here in which to set forth in detail the multifarious ways in which the Navy failed, but one may just rehearse a few general headings. The Navy neglected, ignored and insulted its Air Service. The Navy was completely ignorant of Staff work. The Navy's strategy and tactics were beneath contempt. The Navy refused almost everywhere to co-operate with the Army. The Navy nearly starved this country by its inadequate and stupidly operated convoy work—as for example the heavy losses in the Mediterranean and in the Channel and the sinking of the *Lusitania* and the *Leinster*. The Navy further helped to starve the country by the stupidity of its port controls which kept food ships waiting outside ports to be torpedoed. The Admiralty spent more money without results in proportion to its total expenditure than any other spending department of the Government. The Navy failed to protect our trade routes and Great Britain itself from attack by sea and air, as was its duty as our First Line of Defence. It is therefore unthinkable that in future we can trust ourselves to a Service which proved itself grossly incompetent and unworthy of the trust placed in it.

As to conducing to co-operation between the Navy and the Air Force, there can be no co-operation till the Navy is taught its proper place in the scheme of things. Before long we shall have to co-operate with the German Army and Air Force, but during the War 1914-18 one did not talk of co-operating with Germany. Fraternising with the enemy is not advisable while a war is in progress. And any fraternising with the Navy on the part of the Air Force until the Navy has been defeated and put in its proper place is as dangerous to the moral of the Air Force to-day as fraternising with German troops would have been to the British Army in 1914-18.

The Job of the R.A.F.

The British Navy is a necessity, but it is only a minor necessity. Without any Navy at all the R.A.F. adequately enlarged could assure that no enemy ship could approach within 200 or even 400 miles of our coasts or the coasts of of any of our Dominions or Possessions, and it could do it far more effectively and at far less cost (even including capital expenditure) than the Navy could do it. In a war overseas against an enemy without a powerful Navy—as Russia—the R.A.F. could do its job with no more help at sea than a fleet of tramp steamers and oil-tankers could provide. The Army would be necessary for ground fighting, but the Navy would be practically of no use at all.

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In the event of a war with a nation which has a navy of sorts—for example if France and Italy were silly enough to combine to fight us in a moment of Latin irritation and arrogance—the R.A.F. could settle their hash with a few of its own aircraft carriers. There remains practically only the United States and Japan. The latter could do us no harm in the Pacific if we had adequate air forces at Hong Kong, Singapore and in our Indian, Burmese, Arabian and African Possessions.

As to the States, unless they captured Canada first their hands would be much too full to hurt us. And one does not believe that we shall ever fight the States, for the good reason that we and the American people are too interdependent and at the same time too independent. We and they are in the main solidly Teutonic. They have all the objectionable qualities of the Englishman and his good qualities as well. We abuse one another like pickpockets, but we do understand one another.

Therefore on the whole there seems to be little use for our Royal Navy except to go round and impress people, and perhaps to wear white cap-covers so that people shall know when "Summer is y-cumen in." One has only to read the First Lord's statement aforementioned to see how little use the Navy has been during the past year while the Air Force and the Army have been so hard at work.

The Navy and the Turks.

For a start the Right Honourable Gentleman, Mr. L. S. Amery, steals the thunder of the Air Force. He says:—"The political value of the Naval Forces employed in the Mediterranean during the past year and during the recent protracted negotiations with Turkey needs little emphasis. At a critical period of these negotiations they played a considerable part in the maintenance of peace." As a matter of fact the people who overawed the Turks were the R.A.F. squadrons in the vicinity of Constantinople. The Turkish soldier has lived in terror of aeroplanes ever since the Salmond and Borton operations in Palestine but he has had no respect for the British Navy since its failure to force the Dardanelles in 1914 and its failure to hit the Gallipoli Peninsula in 1915.

The wily old Turk knew that the British Navy could not make a worse mess of Smyrna than the defeated Greeks did and he knew that the British Navy would not smash Constantinople in any case. He also saw that the British Navy did not even menace his Black Sea Ports. But he knew very well that if necessary the Royal Air Force could bomb Angora, and could knock the stuffing out of his troops in the Chanak area. So he was decently respectful. But that was no thanks to the British Navy which might as well not have been in the Mediterranean at all, for all the Turks cared.

Really Mr. Amery, who is a very astute politician, ought not to have let his Naval assistants put such a very obvious mis-statement right at the beginning of his statement. It inspires distrust in all the rest of it.

Our Commercial Travellers.

Then he goes on to say:—"The very successful visit of the Battle Cruisers *Hood* and *Repulse* to Brazil has again demonstrated the peace value of the British Navy politically and commercially."

It would be interesting to know what was the cost in coal or oil of that visit and what was its commercial value. It is at least certain that a visit by a squadron of the R.A.F. on the comic *Ark Royal* would have had far more commercial value, in that we might have sold some aeroplanes as the direct and immediate result. And certainly R.A.F. flying would have impressed the good Brazilians far more than any manœuvres of Naval personnel.

Anyhow, if the Navy is officially going to justify its existence by pleading its commercial value it will at any rate provide the R.A.F. with an adequate retort when the Navy calls the R.A.F. "tax-gatherers" on the strength of the attacks on the R.A.F. in Arabia by the *Daily Mail* and *Daily Express*. Henceforth the Navy may be called "our commercial travellers."

A further justification of the Navy's existence is given in the visit of the Light Cruiser *Caledon* to Memel, where if the good Lithuanians had wanted to be hostile she could have been bombed off by the efficient little Lithuanian Air Force. But against this must be set an apology by Mr. Amery for a Naval failure "the temporary discontinuance of the sloop patrol for the protection of the Murmansk fishery" owing to "the severity of weather conditions."—That is where, if you remember, the Bolshies captured a few English trawler-men and refused to give them up.

The only other two activities of the Navy have been (a) suppressing slave-running in the Red Sea and Persian Gulf where the net result has been "two dhows have been captured and 33 slaves released" and (b) "active patrol in Irish waters for the prevention of arms traffic" and everybody knows how frightfully effective that has been.

There you have the total activities of a Service which absorbs £58,000,000. Set that against what the R.A.F. has done in India (at a nominal cost), in Iraq, in Arabia, in Palestine, in Egypt, in the Soudan, and in Turkey, for less than one-fifth of the cost and then consider which is entitled to be called the Premier Service.

Naval Intelligence.

Some idea of the Naval Intellect can be gathered from this precious document. Referring to the Naval Staff the First Lord says:—"It is an organisation which it must be emphasised is the result of war experience and is an essential instrument for Naval efficiency and security in the future. Any departure from its general principles would be fraught with grave danger." "Gradually a body of Officers with full war staff qualifications, after undergoing one year's training at the Naval Staff College at Greenwich, are becoming available. These Officers are already filling positions both at the Admiralty and at sea."

Figure to yourself if you please the type of mind, if one can call it a mind, which had no Staff and no Staff College before the War, and now as "the result of war experience" feels called upon to justify the existence of a Staff and its College. And think of the "full war staff qualifications" which must be acquired after "undergoing one year's training at the Naval Staff College."

After two years' hard work at Camberley an Army officer realises that he is just beginning to understand the rudiments of Staff work. And our own excellent Commandant at Andover modestly hopes that after the full course at the Air Staff College the students may have learned how to read intelligently. But after a one year's course at Greenwich a Naval officer, who for a start lacks an ordinary public school education, is forsooth judged to possess "full war staff qualifications." Was there ever such a priceless example of the arrogant numbskullery of the British Navy? No wonder the Navy very nearly lost the war for us in spite of its numerical preponderance over our enemies.

The Air Arm of the Fleet.

From these points it is possible to judge what the "Air arm of the Fleet" would be like if manned by the 140 officers and 1,000 men who ought to have been axed and have not been. It seems that it might be very well worth while to let the Navy have its own "Air arm" consisting entirely of the airships for which it has expressed its willingness to sacrifice a third-class cruiser. Then it could draw from the R.A.F. all the ex-Naval people who want to go back to the Navy and all the ex-airship people who want to go back to airships and the R.A.F. would be left undisturbed in possession of everything and everybody that matter.

Taking them all round with a few notable exceptions the airship people were and are a fairly futile lot. Their mentality seems to have been affected by their own hydrogen. They were always for big ideas away up in the air and free from all such mundane details as ground organisation, running costs, staff work and so forth. Most of them are quite nice dreamy schemey folk, perfectly delightful in conversation, charming in manner, plausible in argument, just the very men to convince senior Naval officers and innocent City financiers, but hopeless when it comes to discussing clear-cut Staff-work with a trained soldier.

It would be a great idea to let the Admiralty finance Commander Burney's Imperial Airship Line and man it with its 140 officers and 1,000 men, plus the R.A.F.'s leavings. Then we should get some value out of the Navy vote, much better than the 2 dhows and 33 slaves (whom we cannot even sell and credit to *contra account*).

One believes just as firmly in the commercial value of airships as one dis-believes in their war value against any nation which has a modern air force. One believes that in five or ten years' time if plenty of money were spent on construction experiments airships would be produced capable of running the Indian and Australian mails regularly. Of course Commander Burney's estimates for passenger traffic are worthy of a Naval officer who is also an M.P. and has a passion for airships, but his super-optimism will not matter if he can persuade the Admiralty to finance his scheme. And if he can, then the Navy can run away and play with its gas-bags and leave the Royal Air Force to get along with its job of defending the British Empire and offending the Empire's enemies.

THE AIR ESTIMATES.

With those few kindly meant words of advice we may now proceed to discuss the things which really matter, namely the items in the little bill for the Air Force.

The first thing that strikes one is that though the Air Ministry is committed to raising 15 new squadrons (7 this year and 8 next year) for Home Defence there is only to be an increase of the total personnel from 31,176 to 33,000. There are to be 82 extra commissioned officers, 43 extra

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cadets, 300 extra N.C.Os., and roughly 500 extra airmen. However there must be much greater increases in future years so the younger officers who hold short service commissions need not despair of winning permanent commissions and promotion in the next three or four years by hard work and keenness and especially by specialisation.

The chief headings for expenditure are of great interest.

A Handsome Increase.

The biggest item of all is Vote 3, for Technical and Warlike Stores, a matter of £5,594,000 as against £2,193,000 last year. This is an increase of £3,400,000 odd, and will be welcomed alike by flying personnel and by the Aircraft Trade. Of course it is only about two-thirds of the cost of a battleship which would never be used in action, but it is quite a lot of money for our poor little Air Force and our starving aircraft constructors. Section A £3,620,000 is definitely allocated to "aeroplanes, seaplanes, engines, and spares." The increase here is £2,883,900, which ought to rejoice the hearts of all concerned.

After that the Trade will not grudge so much the money spent on the Royal Aircraft Establishment but it would be well to investigate carefully the expenditure on that establishment. It appears that the total allocation to the R.A.E. under Section B is £380,500, which on the face of it is more than 10% of all the expenditure on aeroplanes, seaplanes, engines and spares which have to provide a living for about 20 firms. Which means that the R.A.E. gets more than as much as the average for two firms in the Trade.

A Financial Puzzle.

But when one investigates further one finds that £345,000 of the R.A.E. money comes out of the allocations for Aircraft, Engines, Spares (Section A), Technical and Warlike Stores (Section D £69,500), Armament and Ammunition (Section E £253,000), Electrical Stores (Section F £143,500), and Miscellaneous Research (Section G £219,500). And there is no indication as to how much each of these sections, in all of which the Trade is concerned, contributes towards the upkeep of what is still in spite of very able superintendence an establishment which is on its existing scale a luxury rather than a necessity.

The wages of staff and hands at the R.A.E. run to £283,200, which is a reduction of about £70,000 on last year, but it still strikes one that the staff are so miserably paid that they cannot be efficient and that a great saving could be effected by having half the staff at a little less than double the rate of pay. It is obviously absurd to think that an efficient and educated typist can be hired for £70 per annum, or a competent designer for £250 to £300

Much the same remarks apply to the wages paid in the Aeronautical Inspection Department (Section C), which very important branch only absorbs £90,500 of the Stores Vote. One can only compliment all the A.I.D. people on the excellence of the work they do for such small pay, and hope that with the expansion of the Trade they may all win promotion and increases in their wages.

Active Improvements.

Under Vote 3 there is a big increase in Armament and Ammunition (Section E) £12,200 in the former and £55,000 in the latter. This looks as if the R.A.F. intended to do some serious shooting and bombing by way of practice, for of course the stuff expended in India and Iraq is bought by the Governments concerned.

Research (Section G.) only has £219,500, which though it is an increase of about £50,000 on last year would be nothing like enough but for the fact that the most valuable research work—in fact all that has ever directly produced progress in design—has been done by the trade and comes out of Section A of this Vote.

The most astonishing item in Vote 3 is Section K., Mechanical and Other Transport £222,500, an increase of about £6,000. Why on earth—very much on earth—the R.A.F. should need to spend £30,000 on complete vehicles and £132,500 on spares and accessories besides (on water) £54,000 on marine craft and £6,000 on marine engine spares is a trifle defeating. One would have thought that the R.A.F. had enough M.T. stuff left after the War to keep it going for the next ten years and that it could have been repaired and re-conditioned in its own workshops. Evidently it would pay the R.A.F. to buy Colonel Searle for £20,000 a year or so to organise its ground transport department, or alternatively to send about fifty selected officers to study the running of Daimler Hire Ltd. and the London General Omnibus Co. Ltd.

There is a satisfactory increase of £28,000 in petrol and a decrease of £8,000 in oil, in Section L. The former, reckoning on the decrease in the price of petrol, means a lot more flying. And the latter apparently is caused by lowered prices and fewer rotary engines in conjunction. Which are both to the good.

Altogether Vote 3 is the best thing the R.A.F. and the Aircraft Industry have seen since the War. Let us hope that everybody concerned gets and gives value for money received.

Pay and Things.

The next biggest item is Vote 1, Air Force Pay, £5,370,000. This shows a net decrease of £273,000 in spite of the increase in personnel, thanks apparently to Appropriations in Aid from Iraq, Palestine and India, though the actual increase is £130,000.

On this vote there is little to be said beyond that the Nursing Service is so badly paid that it amounts to sweated labour. The educational people, schoolmasters, teachers and so forth are also underpaid, but that is always the fate of people whose own educations cost a lot of money. Fortunately the fighting personnel are fairly adequately rewarded for peace-time service.

Vote 4, Works and Buildings, absorbs £3,173,000, a decrease of roughly £60,000. Such expenditure though it seems extravagant must continue till the R.A.F. is adequately housed, which at present it is not as compared with the Navy and Army.

Vote 2, Quarterly and Stores, takes £2,914,000. This is a decrease of £16,000 in spite of increased personnel. Presumably it is explained by the lowered cost of living. Anyhow it is sufficiently reasonable.

The Minor Matters.

These four are the big items in the bill. After them the Air Ministry's own £649,000 (Vote 5) seems trivial, considering all that it has to do for the money. Meteorological and Miscellaneous Effective Services (Vote 6) get £232,000, which is not much. And the Auxiliary and Reserve Forces (Vote 7) have £239,000 allocated to them, which as they are still in the air metaphorically but not practically need not be discussed here.

Civil Aviation (Vote 8) has £301,000. Of this £55,000 is pay and maintenance of Civil Aviation Transport Staff, at aerodromes and on aerial routes and surveys. A sum of £750 (seven hundred and fifty pounds) is allocated for "Aeroplanes, Seaplanes, Engines and Spares," so evidently the Department is optimistic. Works and Buildings absorb £28,300. Civil Aviation Subsidies—including *Purchase of Machines* (in italics for some unexplained reason, perhaps to indicate surprise)—take £205,000.

Against all this receipts from Rentals, Landing Fees, Sales, etc., are calculated to realise £8,250. Licences, Certificates, etc., are estimated to produce £750. So why not, as suggested recently, abolish all landing fees, licences and so forth and thus encourage the private owner?

Taking them all round the Air Estimates are highly satisfactory. They show a small steady advance which is much better than a sudden boom. At the present rate the Royal Air Force may reasonably hope to be big, efficient and properly equipped within the next five years, which ought to be in very good time for the next war. And within that time, allowing for a corresponding improvement in general trade, the Aircraft Industry should be as firmly established as was the Engineering Industry before the War 1914-18, and so it should be in a position to expand at such a rate as to give adequate support to the Air Force in that war.—C. G. G.

AIRCRAFT IN PARLIAMENT.

THE FIRST LORD OF THE ADMIRALTY, in the course of introducing the Navy Estimates on Mar. 12, said:—

"The sea will always remain the chief base of world-wide mobile power, but the effective exercise of sea power itself will be profoundly influenced by the use of the air weapon. The Admiralty and the Air Ministry take different views as to the problem of air defence.

"The Admiralty claim that naval air work is so vital and integral a part of the Service that it can be most efficiently done apart from central control This difference in points of view affecting two great services can only be settled by the kind of inquiry which the Prime Minister has announced; and in the interests of efficiency it is to be hoped that it will be settled with the least possible delay."

MR. LAMBERT said that a Navy without aircraft was a dangerous, deceptive delusion. Any air service with which the Navy was connected must be exercised with the fleet, must be under the command of naval officers, and must be in daily contact with the ships. Harmonious working on the part of the three services was necessary to efficiency. It was greatly to be deplored that there should be any friction. Before and during the war the Admiralty could guarantee the safety of this country against invasion, but they could not do it now.

CAPTAIN VISCOUNT CURZON (C., Battersea, S.): Will the right hon. gentleman say what he means by invasion?

MR. LAMBERT said he imagined that our Navy could prevent foreign ships from bringing soldiers to our shores, but the Navy could not prevent the bombing and burning of London by hostile aircraft, and was not that invasion?

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AERONAUTICAL ENGINEERING

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THE WEEKLY COMMENTARY.

The diverse opinions of many people on the subject of the new proposals for the subsidisation of Civil Air Services have been considered before writing the article which appears below.

The article itself is in effect an analysis of the more important of these opinions. It is believed that it can in no wise be considered as expressing a definite opinion in favour of, or against, the scheme as a whole, but purely as an attempt to make clear how very far from simple are the problems which are involved in this question.

That is to say that it does not maintain either that it is necessary, or that it is not necessary, artificially to develope civil aviation, but it does indicate that if it is decided that it is necessary then certain somewhat complicated practical problems have to be considered.

These considerations are not of a nature to be settled by the pronouncements of authority. Generally the conclusions are that Civil Aviation can be made to pay only as a result of practical experience with the operation of Air Services, and that if it is decided to hasten artificially the advent of self-supporting Air Services the running of non-paying experimental lines is an essential part of the work.

PRACTICAL ASPECTS OF THE NEW SUBSIDY SCHEME.

By W. H. SAYERS.

From the considered opinions on the subject of the recent proposals for a new scheme of air-line subsidies which have now been received from a number of recognised authorities it seems fairly common ground that assuming subsidies to be necessary or desirable, the new scheme for one large company, dowered with a subsidy of £1,000,000 spread over a period of 10 years marks a distinct advance over the previous schemes.

THE DANGERS OF MONOPOLY.

On the other hand there is a wide diversity of opinion in the first place as to whether the subsidisation of air transport is either necessary or even the best method of giving financial support to the development of commercial air transport, and in the second place as to whether the danger of giving a virtual monopoly to one big firm is not a disadvantage which may outweigh the value of any development for which such a monopoly may be responsible.

Taking the latter first it seems fairly obvious that a complete monopoly of all air transport business in this country would be very dangerous. There are undoubtedly branches of the air-transport business which can be run commercially without any Government assistance—the De Havilland Hire Service is a case in point—and it is of the very greatest importance that no obstacle of any kind should be put in the way of the development of such services by independent private enterprise.

There is nothing in the scheme in its present form that suggests that it is proposed directly to subsidise services of a kind which would compete for example with the De Havilland service, and one may very fairly assume that no Government department would allow money expended or lost by the subsidised company in competition with services of this type to be taken into account in estimating the subsidy which might reasonably be allocated for any particular period. That however is not a sufficient safeguard. The very existence of the large company with a complete organisation and equipment supported by public funds would allow it to compete on unusually favourable terms without any direct support of that particular branch of its business, and it could in fact "freeze out" any small independent concern which had discovered a profitable side-line in commercial aviation.

ONE NECESSARY SAFEGUARD.

This difficulty can be met by making it one of the terms of the company's agreement with the Government that their activities should be confined to within certain specified limits—which should be those of running definite air lines to a published schedule, such services being definitely available without discrimination to any member of the public wishing to take advantage of them. That is to say that they should be expressly prohibited from hiring special machines for special services at special rates. Provisions of this kind can be and have been enforced in many public services where some sort of monopoly is granted to a company without in any way interfering with the companies' general freedom of management. There are clauses in the Electric Lighting Acts which forbid the granting of special terms to individual customers. This provision does not limit in any way the companies' right to make special rates for special circumstances—but if they make such an agreement with one customer they can be compelled to grant similar terms to any other customer under similar circumstances.

Some such provision would be a very definite safeguard to the small concern operating independently. The large company could not quote cut rates to attract the small companies' customers without being obliged to offer the same terms to any other customers needing the same kind of service. This by itself would not be a complete protection and the company should at least be barred specifically from direct competition with any existing concern which was operating on an independent basis.

MONOPOLIES SOMETIMES NECESSARY.

This whole question of the danger of monopolies is one which cannot be settled by the simple process of saying that a monopoly is an evil thing and therefore not to be tolerated. However evil a thing a monopoly may be in itself there are numerous cases where the absence of monopoly leads to even greater evils. In this case the question of whether a monopoly is either necessary or desirable has to be considered from the practical point of view.

If one assumes that it is necessary to develop aerial transport of any kind at a reasonably rapid rate one at once comes to the fact that somehow or another money—considerably more money than is now available—must be obtained. And whether one holds that the money should be spent on running air services, on subsidising research, or on building new machines for the Air Force, raising the money is a necessary preliminary.

If it is decided that any one method of developing aerial transport is desirable the first problem is how can enough money be raised for that particular method. The question whether the development of civil air lines is necessary or desirable is one quite apart from that of how to raise money for that particular purpose. But if it is admitted that this method should be pursued, then the question of whether a monopoly of air transport or of some particular form of air transport shall be given to one particular company comes down to the severely practical one "Can the necessary money be raised without giving a monopoly?"

If the answer is "No" then either the monopoly must be granted, or one must give up any idea of developing civil air transport until circumstances have changed and with them the answer to this question.

A very competent committee on the financial problem have given as their opinion that the necessary money cannot be raised unless such a monopoly is given.

Generally speaking it is difficult to disagree with them on

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this point. Civil air transport does not pay, and is not likely to pay for some little time and until some considerable sums of money have been spent in the process of finding how to make it pay. Nobody is likely to spend that money if as soon as they have made the business pay it is to be open to the world at large to compete with them—without the handicap of the initial capital spent on development and experiment—but with the benefit of some fair proportion of their experience. Some sort of security of tenure of the business which they have built up must be granted to those who risk their money in the development work—and that means in the present case at any rate a monopoly to some extent or another.

Money, to any extent for any purpose, can be borrowed if the security offered satisfies the lender—which in any case such as the present is the investing public. If the public will not invest except on terms you cannot offer there is an end of the matter, you cannot borrow it.

The committee in this case say that a 10 years' monopoly of the operation of British air lines is one of the securities that will be necessary in this case and their suggestion does not seem to be an unreasonable one, all the facts being considered

IS IT NECESSARY TO DEVELOP CIVIL AVIATION?

This leaves open the whole question as to whether it is really necessary to do anything at all to develop civil aviation, and the further one of whether developing air-transport lines is the only, or even a necessary method to pursue for this purpose at the present moment.

There seems to be a general concensus of opinion that civil aviation must and will be developed. Some few seem to believe that it will develop to the best effect if it is left severely alone

The argument in this case is generally that National and Imperial considerations call for the development of military aviation on a large scale. In the present state of affairs there is not enough money to go round and every farthing that can be raised in any way for aviation should be put into military aviation. This—it is alleged—will secure the development of a healthy aircraft-constructing industry, and that industry will be able from its own resources to develope economical aircraft which in turn will lead to economical air transport capable of supporting itself.

This is a very sound argument from many points of view. It has the appealing virtue of simplicity, it is logical, and it is based on the undoubted fact that as things are at present the R.A.F. is nothing like as strong as it should be and will in the near future be entirely inadequate unless it is greatly strengthened in every way.

SIMPLE AND LOGICAL, BUT—

Unfortunately—like most of these simple and apparently perfectly logical arguments—it omits to take account of certain very relevant facts, and takes for granted a number of very questionable assumptions. Of these a few may be mentioned although a complete discussion of so political a question is scarcely in place here. It assumes firstly that it is possible to raise as much money for the Royal Air Force as it will be possible to raise for both the Royal Air Force and for civil aviation combined. It is possible to argue that this ought to be the case. It is impossible to hold that it is the case. As a matter of practical politics after Parliament has voted the maximum sum to which it will consent for the R.A.F. it would still be possible to persuade it to vote some further sum for civil aviation. Secondly all expenditure on the R.A.F. is raised in the form of taxes. Again as a matter of practical politics there is a limit to the amount of taxation which a nation can stand. But when that limit is reached there is still the possibility of raising capital for trading purposes if reasonable security, etc., can be offered. There is also the assumption that money voted for the Royal Air Force will be used efficiently in the development of aircraft. Without in the least casting any unnecessary reflections on the R.A.F. one must hold that this assumption is extremely questionable.

The standard of efficiency of the personnel of the R.A.F. is vastly more important than the provision for their use of the very best attainable equipment. The equipment itself must be kept up to a certain fairly high standard, but if any great increase is to be made in the expenditure of that force the greater part of that expenditure should go not to equipment so much as to training and organisation.

In fact the Air Force will have to become a vastly larger organisation than it now is before it can support an Aircraft Industry big enough to develop Civil Air Transport from its own resources.

One may also question whether an Aircraft Industry solely dependent on military orders is likely to be an efficient instrument for the development of civil aircraft. Such evidence as is available tends to show that civil-aircraft development has been retarded by the influence of military ideas on the subject of aeroplane design.

However it is not particularly necessary to stress these arguments very highly. The most important fallacy in regard to this particular argument is that it assumes that the only problem which has to be solved in regard to civil aviation is the production of efficient aeroplanes. On this point the evidence of fact is fairly conclusive. The efficiency and economy of the aeroplanes actually in use to-day are far from being satisfactory. But costly and inefficient as they are they can be made to pay if enough traffic can be obtained, and if the costs of organisation and management can be reduced. That being the case it is obvious that more than the production of efficient aeroplanes is required to set commercial aviation on its own feet.

PROBLEMS WHICH HAVE TO BE SOLVED.

There are innumerable detail problems as to management and organisation to be solved. The Daimler line has attacked some of these problems with conspicuous success. When they announced their intentions in this matter a large number of those who were entitled to express an opinion on their programme prophesied disaster. Some of them still hold that disaster has so far been avoided only by sheer luck.

It is entirely unnecessary to argue as to whether these authorities are right or wrong. The proposals made by Col. Searle and put into practice by him in the Daimler service are being put to the test of experience—the only test that has any real value in matters of this sort. It is ridiculous to suppose that the Daimler experiment of "intensive flying" covers the whole of the problems of aircraft operation alone—or that on the limited scale on which it has so far been tested it exhausts all the possibilities in that particular direction.

A QUESTION OF SELLING.

Then there is the question of traffic. This is a matter of selling air transport to the public, but it is certainly not a question solely of the price—in terms of ton or passenger miles—at which it can profitably be sold. If traffic were solely a matter of price, taxis at 1s. per passenger mile would be outside the range of commercial transport. Air traffic is insignificant not simply because £6 6s. is an exorbitant price for a 240-mile journey, but because on the particular journey, and under all the circumstances the public does not consider that it gets value for its money.

It is impossible to assess accurately all the reasons which lead the public to this conclusion but it is fairly safe to say that among them are the facts that the public is not satisfied that air transport is safe, or that it is reliable, that it knows that a very limited service only is given and that unless the time-table happens to fit in very excellently with their own engagements they will at the best save comparatively little time by using it and may—if the weather is unpropitious—lose quite a lot of time by trying to use it.

In addition they have generally the impression that air transport is extraordinarily uncomfortable on account of the noise, and that it may lead to sickness as distressing as seasickness during the whole journey.

It certainly does not follow that the public would consider the price too high if any or all of these objections to air transport could be removed from its mind. And it is not possible to predict to what extent the removal of any one specific objection would alter public opinion. One could undoubtedly make fairly useful estimates on the basis of experience—but the experience is essential. Still more important is the fact that the public has to be convinced.

THE PERFECT SERVICE WHICH WOULD NOT PAY.

If an air line were to be established forthwith, equipped with perfect aeroplanes, and perfect engines, with a completely efficient organisation, providing a hourly or half-hourly service between London and Paris with absolute regularity and reliability, it would have to operate for some appreciable time before the public could be convinced that all the drawbacks other than that of price had actually been removed from the air transport services.

Technical development of the aeroplane alone is not a solution of the problem. There is not and can never be any absolutely good aeroplane. A good aeroplane for one purpose may be a very bad aeroplane for another purpose. And if the purpose of the aeroplane is that of carrying paying passengers or goods it does not matter in the very least how good the aeroplane may be if those who should do the paying refuse to believe that it is good enough.

So that to make air transport pay it is necessary—quite apart from any question of purely technical improvement—to make practical experiments on the operating side. It is necessary to do this first of all to find out what the public want and how much they are willing to pay for it, and

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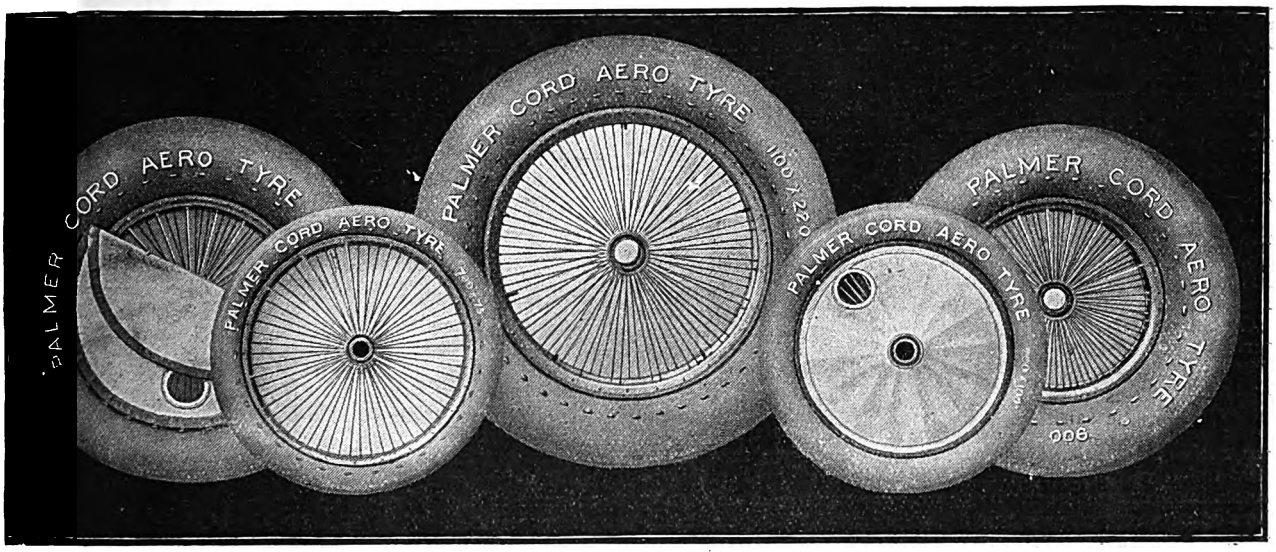
PALMER

LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
300×60	16	111.12	25.4	Central
„	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
„	138	130.	38.09	Central
575×60	21	160.	28.	Central
„	34	150.	31.75	104/46
„	111	150.	38.09	104/46
600×75	21	160.	28.	Central
„	34	150.	31.75	104/46
„	111	150.	38.09	104/46
700×75	78	178.	44.45	132/46
„	79	178.	44.45	Central
„	100	178.	38.09	132/46
„	101	178.	31.75	132/46
700×100	77	178.	44.45	132/46
„	92	185.	55.	135/50
„	95	185.	55.	Central
700×100	96	178.	55.	132/46
„	99	178.	38.89	132/46
„	112	150.	38.09	Central
650×125	119	178.	55.	132/46
750×125	77	178.	44.45	132/46
„	92	185.	55.	135/50
„	95	185.	55.	Central
„	96	178.	55.	132/46
„	99	178.	38.89	132/46
„	112	150.	38.09	Central
800×150	82	185.	55.	135/50
„	85	185.	55.	Central
„	36*	185.	55.	135/50
„	40*	185.	60.32	135/50
„	152	185.	66.67	135/50
„	163*	185.	66.67	135/50
1000×150	131	220.	66.67	Central
„	102	185.	55.	125/60
„	141	250.	80.	Central
„	201	185.	60.32	125/60
1000×150	209	185.	55.	Central
„	210	185.	60.32	Central
1000×180	148	220.	80.	Central
„	149	185.	55.	Central
„	155	220.	66.67	Central
900×200	107	185.	55.	Central
„	108	185.	55.	125/60
„	128	220.	66.67	Central
„	137	250.	80.	Central
„	202	185.	60.32	Central
1100×220	134	220.	66.67	Central
„	136	250.	80.	Central
1250×250	133	250.	80.	Central
„	154	304.8	101.6	Central
1500×300	115	304.8	101.6	Central
„	126	304.8	152.4	Central
1750×300	139	400.	152.4	Central

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secondly in order to convince the public that you can and do give them what they want.

This is the answer also to those who hold that if it is necessary to spend £1,000,000—or any other sum—in the encouragement of air transport, it would be more likely to produce useful results if it were spent entirely on research.

Taking research in its broadest sense—that of searching for knowledge—the development of air transport is essentially a problem of research. But the problems of practical operation and so forth are of the first importance and the more restricted problems of the structural and mechanical design of aeroplanes can only be solved to any real advantage when experience of operation has indicated what qualities are needed from the machines.

And those qualities are not the qualities which the Controller of Civil Aviation or the Editor—or even the Technical Editor—of THE AEROPLANE consider to be satisfactory. The essential qualities are those for which the customers of air transport services are willing to pay a little more than it costs to provide.

Short of mob-psycho-analysis the only possible method of determining precisely what these qualities are is that of experiment on a fairly large scale.

It is suggested—on very high authority—that the necessary capital for such experiment can be raised on certain terms and—at present—on no better terms.

One may decide that those terms are too onerous. Then one may quite rightly decide to leave civil aviation severely alone until the necessary capital can be raised on acceptable terms. Obviously there can be the widest possible range of opinion as to what are acceptable terms.

Or one can decide that it is of the first importance that the period of experimental development should be shortened in every way, and that one must raise the capital on whatever terms may be possible.

But there is no justification for the suggestion that one can attain the same result without spending money on the running of experimental services. However much money one may spend on the Royal Air Force, and however much of that money may be spent by contractors to the R.A.F. in the development of more efficient machines or however much research is performed, Commercial Aviation will not pay until still more money has been lost on experimental operations.

And on general principles one would expect that money expressly provided for that specific purpose would produce a greater result than the same amount paid to people who might expend it for that purpose, but who equally might not.

It must however be pointed out that the above arguments are of expressly limited scope.

If it is decided that there is no justification for the artificial encouragement of civil aviation, they become of purely academical interest. They have no bearing whatever on the question as to whether in the national interest as a whole it would be wiser to spend an extra £1,000,000 on the R.A.F., or to spend it on civil aviation.

They are merely directed to show that the result which can be attained by spending money on running experimental air services cannot be attained in any other way. They do not even touch on the question of whether £1,000,000 spent now would be more effective than a smaller sum spent later.

AEROPLANES FOR BULGARIA.

The Department of Overseas Trade—efficient as ever—notifies the fact that the Secretary in Charge of Commercial Affairs at Sofia reports that the Bulgarian Directorate of Posts and Telegraphs have invited tenders for the supply of 10 two-seater (including pilot) and two or three passenger aeroplanes (5—8-seaters). The latest date for the submission of tenders is Mar. 25. Tenders should be addressed to the Department of Air Service at the Ministry of Posts and Telegraphs at Sofia. Further particulars can be obtained by British firms interested on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1.

BACK NUMBERS.

Could any reader who has spare copies of THE AEROPLANE dated Mar. 13, Mar. 20, and Apr. 17 of 1918 oblige with these numbers a correspondent who wishes to complete his volume?

A CHAUVIERE PROPOSITION.

Those who remember the excellent work done by Chauvière airscrews in the past will be interested to hear that M. L. Chauvière is now developing still further designs of air-propelled boats, a type of water vehicle which came into being almost as soon as the aeroplane itself. M. Chauvière's latest production is a motor barge capable of carrying over a ton of useful load in five inches of water at 40 kms. (25 miles) per hour.

This particular type of barge is of course chiefly useful for tropical rivers where weeds interfere with the use of ordinary water-propellers and in very shallow water where the depth of immersion necessary for ordinary screws probably means that they will fall foul of the muddy bottom. One would imagine that such barges would be particularly useful in Iraq for use with the R.A.F. where there would be the additional advantage that the engines and airscrews would be of a nature similar to those the R.A.F. habitually handle.

M. Chauvière would be glad to get in touch with some responsible firm who would take up the rights of his latest designs for the British Empire and one would be pleased to put anybody interested in touch with M. Chauvière's representative in this country.

AN AMERICAN VISITOR.

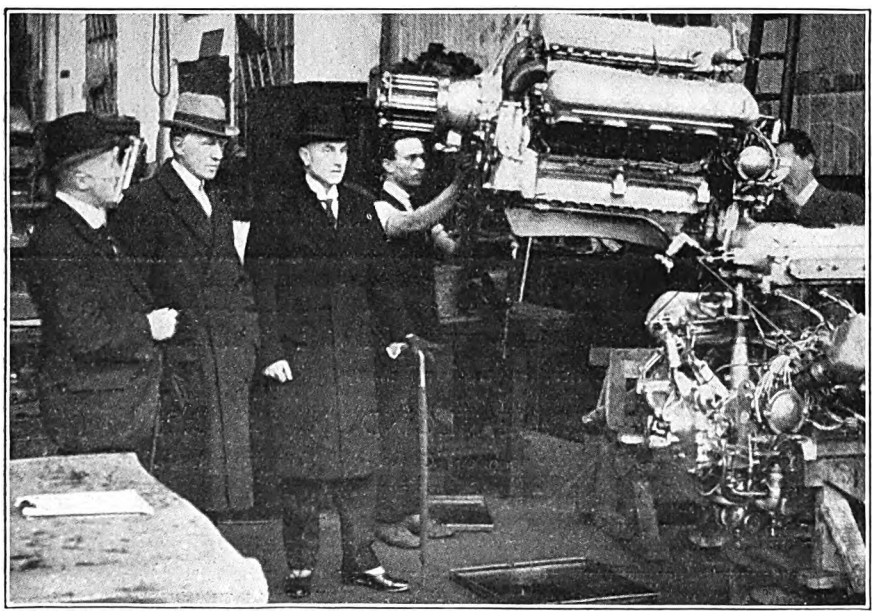
The Royal Aeronautical Society announces that the eleventh annual Wilbur Wright Memorial Lecture will be read this year by Dr. Joseph S. Ames, Director of the Physical Laboratory, the Johns Hopkins University, Baltimore, Md., in the Theatre of the Royal Society of Arts, 18, John Street, Adelphi, London, W.C.2, on Thursday, May 31, at 5.30 p.m. The subject of the lecture will be "The Relation between Aeronautical Research and Aircraft Design." Tickets may be obtained from the offices of the Society, 7, Albemarle Street, London, W.1.

COMPANY NEWS.

WYCOMBE AIRCRAFT CONSTRUCTIONS, LD.—G. A. Brigstocke, of Basildon House, 7-11, Moorgate, E.C., was appointed Receiver on Feb. 14, 1923, under powers contained in debenture dated Apr. 3, 1922.

BRITISH ANZANI ENGINE CO. LTD.—Satisfaction to the extent of £666 13s. 4d., on January 26th, 1923, of debentures dated September 10th, 1920, securing £10,000.

CELLON (RICHMOND), LTD.—Satisfaction to the extent of £500 (being balance) on Dec. 19, of debentures dated Feb. 20, 1922, securing £10,000.



SAMUEL IN THE LION'S DEN

(With Apologies to Past and Present Historical Personages).

Colonel Sir Samuel Hoare, Bart., C.M.G., M.P., the Secretary of State for Air, getting to know the Napier "Lion" in its home at the Napier Works at Acton. With him are Sir Harry Brittain, M.P., a Director of the Napier Co., and Mr. H. T. Vane, the Managing Director.

This is one of a series of visits paid by Sir Samuel Hoare to the more important aircraft and aero-engine works with a view to familiarising himself with the Industry which depends upon his Department—and vice-versa.

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ON THE GREAT GAME.

Who now can deny that the R.A.F. is the Premier Service? To have beaten the two Senior Services at the one game that matters puts the R.A.F. at the top of the tree. Whether Wellington did or did not say that Waterloo was won on the playing-fields of Eton does not matter much, the idea itself is right. The Service which can win at Rugger is the Service which can win in war.

Rugby football is essentially a sahib's game. Association is merely for the masses who cannot take and give a hammering in a sporting spirit, who cannot wring a man's neck one minute and have a drink with him the next. "If" as Kipling says "you can force your heart and nerve and sinew To serve your turn long after they are gone, And so hold on when there is nothing in you Except the Will which says to them: 'Hold on!'" then you can play Rugger. If not you had better play Soccer.

And now the R.A.F. has proved itself to be the Rugger Champion of the King's Armed Forces by beating the pick of the Army at Aldershot as it beat the pick of the Navy at Twickenham. Moreover it showed itself to be the Rugger Service for although the game was played in the heart of the Army there were far more Other Ranks of the R.A.F. present than there were of the Army.

Especially inspiring were the sporting airman with the good old R.F.C. flag which he waved frantically at moments of crisis and the Serjeant-Major (one hopes he is an S/M.—he ought to be judging by his voice) with the megaphone who gave good advice at intervals. A stage whisper of "Watch 'im Sir, Watch 'im Sir," from a megaphone heard right across a football field must be real encouragement to an anxious forward waiting to charge down a free kick. And one of the finest sights of the day was after the No Side had been given when the mass of blue-clad R.A.F. Other Ranks charged across the field led by the megaphone with the light and dark blue and red R.F.C. banner streaming overhead.

The officers of the R.A.F. and their wives also seem to take a keener interest in Rugger than do those of the other Services. They came in cars and cycle-cars and chars-á-bancs from all over the country. The Air Marshal himself was there though suffering from 'flu (let us hope the victory cured the ailment), all the Vice-Marshals in England were there and nearly all the Air Commodores, Graptains (as the irreverent call their Group Captains) stuck out all over the place, Wing-Commanders were about three-a-penny, and as a junior officer remarked one couldn't move without treading on a Squadron Leader. Parties came from Andover, Halton, the C.F.S., and Eastchurch, and even far-away Martlesham and Cranwell were well represented. Judging by the row the R.A.F. predominated in the covered stands as heavily as they did in the bleachers on the other side of the ground, or else the upper air is good for the vocal chords. Truly it was a great day for the R.A.F.

The course of the game is adequately described by our Rugger specialist C.M.McA. in the proper place under the R.A.F. Sports heading so one need only make a few general remarks on the play. The game was won by the forwards as was that against the Navy. Once more it was the ferocious tackling of the R.A.F. which smashed the enemy's attacks.

The Army three-quarter line was better than ours—Palmer of the Queen's is a marvel—but they never had a chance to get going and their one try early in the second half was the result of carelessness caused by over-confidence. It had a wonderfully salutary effect on the R.A.F. Middleton, the Army full back, played the finest game one has seen since the days of Gamlin of Somerset, and his goal kick was perfection.

The R.A.F. full, L/AC. Runham, was nervous at the start and fumbled badly but thereafter recovered his form and kicked splendidly. Our three-quarters were horribly uneven. Lowe, who by the rules of the game ought to be on a shelf among the interesting antiques, was right at the top of his best international form. His try in the second half was the real thing. Carter was a fair average. Bryson played the worst game of the day, hanging onto the ball and doubling back and being collared when he ought to have passed out to his wing. Twice at least Riddle had a clear run in if Bryson had handed over to him instead of running to the centre. Consequently Riddle, who was probably the fastest man on the ground, never had a chance. But both he and Bryson tackled magnificently.

Russell our scrum half played the game of a lifetime, but he has rather a bad Welsh trick of picking-up the ball when it has not been properly into the scrum and that wastes time and energy. Apart from that one has seldom seen such a worker. His style and methods remind one of Cameron of Bective away back in the Dark Ages. White the stand-off half was at any rate competent even if he escaped distinguishing himself.

The forwards were all wonderful. They used their feet in the loose better than one has seen them do hitherto and their rushes, almost always headed by Wakefield and Simpson, gained much ground on many occasions, but they might still do more of it. Wakefield was magnificent. Over and over again he burst through a mass of Army forwards by sheer brute force and the fact that he was always there whenever the ball went over the line showed that he was using his head as well as his strength. He led his forwards physically as well as morally. And Simpson was so good that he can only be described as not being second even to Wakefield.

An extraordinarily hard worker is young Coventry of the C.F.S. In every Rugger team one has known there has always been a dirty little boy who managed to acquire more mud than anybody else on the field. In the R.A.F. team Coventry is essentially it, and as in all the other cases his mud is honourably acquired for wherever two or three or sixteen are gathered together in a heap on the ground there is the dirty little boy in the midst of them underneath with the ball, generally as the result of going down to a rush and holding on. With a few more years to add weight and strength Coventry ought to be up to International form. As it is he is worth his place in any team.

One of the prettiest bits of play was the run and pass to Lowe by AC. Collins of Flowerdown which scored our second try. He drew Middleton's tackle and passed at exactly the right moment when a less intelligent forward would have held on and tried to dodge. Later he was knocked clean out for a few minutes but pulled himself together and though still doubled-up with pain chucked himself into the scrum according to the best tradition of the sahib's game. Adams of Netheravon who scored the R.A.F.'s first try is another of the World's Workers who is a credit to his side. In fact all the forwards worked so hard and skilfully that it is almost invidious to mention names, and in fact one has only mentioned those whose deeds were particularly noticeable from one's own position in the stand. Doubtless in another position one would have seen other equally gallant efforts.

Anyhow, the R.A.F. has shown the Senior Services that it is their better at Rugger so now perhaps the once-despised Air Force will be treated with proper respect in Clubs and places where the Services meet. If we had merely beaten them at Soccer there would be nothing particular to say, but Rugger is quite another story.—C. G. G.

R.A.F. INTELLIGENCE.

The King's Levee.

H.M. the King held a Levée on Mar. 6 at St. James's Palace. H.R.H. Group Capt. the Prince of Wales, K.G., was present. Among those in attendance upon His Majesty was Air Chief-Marshal Sir H. M. Trenchard, Principal Air Aide-de-Camp. The Secretary of State for Air attended the Levée and presented the following officers of the R.A.F. to the King:—Ashby, F/O. G. D.; Bennett, F/O. V. G.; Buscarlet, F/O. W. A.; Cockey, F/Lt. L. H.; Deacon, F/Lt. G. R., M.C.; Duck, S/Ldr. W. A., O.B.E.; Jackson, Wing/Cdr. A. H.; Johnson, F/Lt. F. E.; Trapagna-Leroy, F/O. M.G., A.F.C.; Lewin, F/O. B. A.; Ling, F/O. E. M.; Linnell, F/Lt. F. J.; Macrostie, F/O. R. D., M.B.E.; Maskell, F/Lt. A. S.; Nicholl, F/O. H. W.; Paull, F/O. A. H.; Peek, S/Ldr. J. H.; Rogers, F/O. W. R.; Thomson, Wing/Cdr. G. H., O.B.E.

Appointments.

Air Ministry, Mar. 8.

General Duties Branch.—Air/Cmdres. T. I. Webb-Bowen, C.B., C.M.G., from H.Q., R.A.F., India, to R.A.F. Depot (Supernumerary), 27/1; F. C. Halahan, C.M.G., D.S.O., M.V.O., from Air Ministry (A.M.S.R.) (D.A.I.) to R.A.F. Depot (Supernumerary), 5/3.

Group/Capts. C. S. Burnett, C.B.E., D.S.O., from R.A.F. Depot to Air Ministry (Dept. of C.A.S.) (D.O.I.), on appointment as Deputy Director, 23/2; A. M. Longmore, D.S.O., from R.A.F. Depot to H.Q., Iraq, 23/2; J. A. Chamier, C.M.G., D.S.O., O.B.E., from Air Ministry (Dept. of C.A.S.) (D.O.I.) to H.Q., R.A.F., India, 23/2.

Wing/Cmdr. H. A. Williamson, C.M.G., A.F.C., from R.A.F. Depot to H.Q., Iraq, 23/2.

S/Ldrs. G. H. P. Padley, from No. 2 F.T.S. to Aircraft Depot, India, 23/2; Sir N. R. A. D. Leslie, Bt., C.B.E., from No. 25 Squadron, Constantinople Wing, to R.A.F. Depot (Supernumerary), pending commencement of R.A.F. Staff course, 19/2, R. Graham, D.S.O., D.S.C., D.F.C., from No. 60 Squadron, India, to R.A.F. Depot (Supernumerary), 5/2.

F/Lts. H. H. M. Fraser, from No. 2 F.T.S. to Aircraft Depot, India, 23/2; D. W. King, from School of T.T. (Men) to Mechanical Transport Workshops and Pool, Palestine, 23/2; C. T. Anderson, D.F.C., from School of Army Co-operation to No. 3 Wing H.Q., India, 23/2; C. J. Truran, A.F.C., from No. 7 Group H.Q. to No. 55 Squadron, Iraq, 23/2; M. L. Taylor, A.F.C., from School of Photography to H.Q., Iraq Command, 23/2; G. H. Cock, M.C., from No. 2 F.T.S. to No. 84

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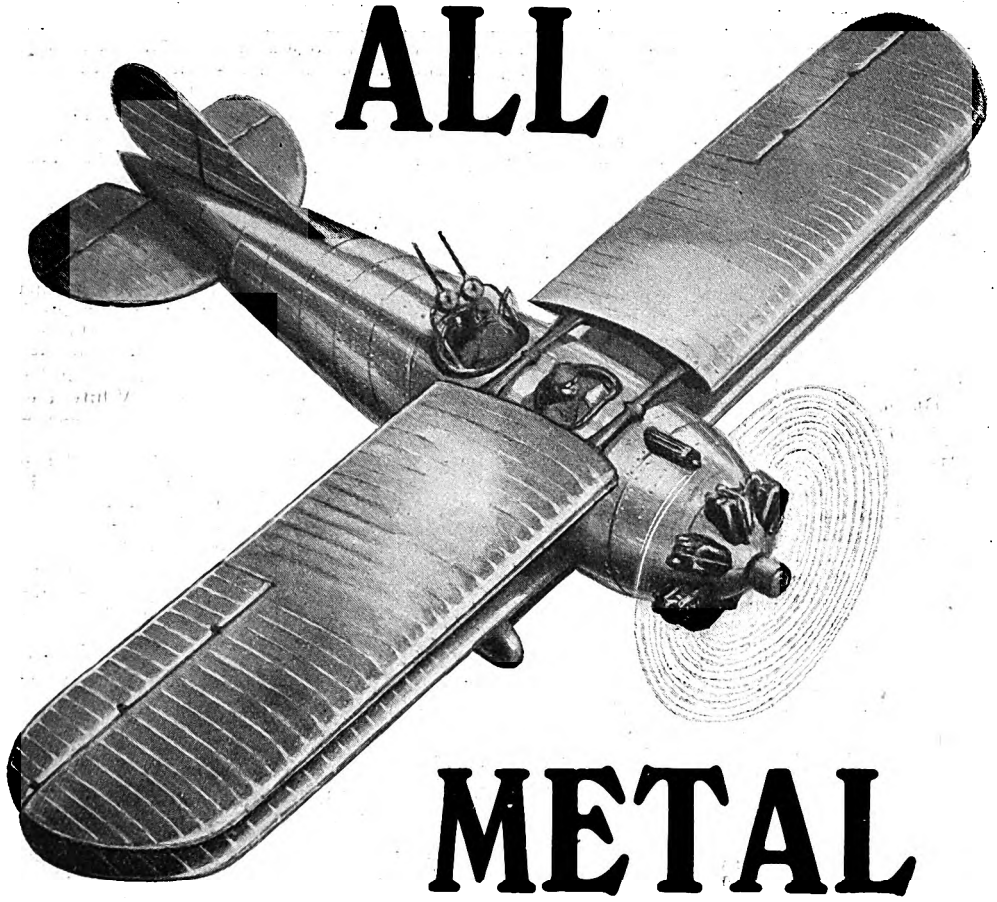

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Squadron, Iraq, 23/2; T. H Newton, D.S.C., from R.A.F. Base, Calshot to No. 45 Squadron, Iraq, 23/2; H. E. P. Wigglesworth, D.S.C., from No. 2 Squadron to No. 84 Squadron, Iraq, for duty as Adjutant, 23/2; T. F. N. Gerrard, D.S.C., from No. 5 F.T.S. to No. 1 Squadron, Iraq, 23/2; C. B. Dick-Cleland, from R.A.F. Staff College to No. 30 Squadron, Iraq., for duty as Adjutant, 23/2; L. G Paget, A.F.C., from No. 1 F.T.S. to No. 55 Squadron, Iraq, 23/2; P. R. T. J. M. I. C. Chamberlayne, A.F.C., from No. 60 Squadron, India, to No. 20 Squadron, India, 15/2; C. J. S. Dearlove, from No 5 Squadron, India, to No. 60 Squadron, India, 15/2; K. A. Lister-Kaye, from No. 5 Squadron, India, to No. 27 Squadron, India, 15/2; L. J. MacLean, M.C., from H.Q., Iraq., to R.A.F. Depot (Supernumerary), 24/1; W. C. Day, M.C., from No. 4 F.T.S. (M.E.) to No. 216 Squadron, 16/2.

MEDICAL BRANCH.—F/Lt. J. A. Perdrau, M.D., from R.A.F. Depot to No. 39 Squadron, 28/2.

STORES LIST.—S/Ldrs. G. A. Hilliar, from H.Q., R.A.F., Cranwell, to Aircraft Depot, India, 23/2; E. W. Havers, from No. 3 Stores Depot to command Stores Depot, Iraq, 23/2.

F/Lt. J. V. Mason, from R.A.F. Depot to Aircraft Depot, Iraq, 23/2.

ACCOUNTANT OFFICERS.—F/Lt J. S. Griffiths, from School of T.T. (Men) to No. 1 F.T.S., 26/2.

R.A.F. SPORTS AND PASTIMES.

(Un-Official.)

The R.A.F. v. the Army.

The R.A.F. played the Army at Aldershot on Mar. 10 and beat them by two goals and a try (13 points) to a goal (5 points). The Air Force forwards got to work very quickly and packing down tighter and breaking up more quickly than the Army looked dangerous from the start. Early in the first half Carter got the ball and after gaining a considerable amount of ground on his own passed to Lowe. The latter was brought down but Adams got over from the scrum. The goal-kick failed.

The R.A.F. attacked again but were driven back by the terrific kicks of the Army full-back, Middleton, who played a great game. A free kick for the Army near the halfway line missed the goalpost by a few feet. Some beautiful passing by the Army was smothered by the speed of the R.A.F. forwards who using their feet to considerable advantage brought the play back to the Army's "25." The Army massed their defences but Wakefield picked up and barging his way through at least five of the Army team scored a wonderful try, which Runham converted.

Early in the second half Collins broke away and gave Lowe a perfect pass. Lowe swerved away from Middleton, put on a burst of speed and went straight over the line, dodged a couple of Army backs and touched down near the goalpost. Runham kicked another goal.

The Army then made a valiant effort and G. V. Palmer on their left wing got well away. He was brought down but getting a pass from Worton in the scrum dashed across with it near the flag. Middleton converted with a wonderful kick from a very nasty angle. The R.A.F. forwards put in some splendid work in the loose led by Wakefield and Simpson but there was no further scoring.

The weakest part of a fine R.A.F. side were the insides and the stand-off half. They frequently fumbled their passes and passed wildly. Also from a spectator's point of view there seemed no reason why again and again they passed back again to the centre instead of giving their wings a chance. Lowe got a few passes which he used to very good purpose but Riddle, who is equally fast and very hard to bring down, got none at all. Runham at full-back started badly, kicking short and not kicking quickly enough but he found himself after about ten minutes and his game was not far short of brilliant. But most of the honour and glory must go to the forwards, Wakefield and his great pack.—C. M. MCA.

The R.A.F. Team were: L/AC. Runham; F/Lt. Lowe, F/Lt. Bryson, P/O. Carter and F/Lt. Riddle; F/Lt. White and S/Ldr. Russell; F/Lt. Wakefield, F/Lt. Usher, F/Lt. Simpson, S/Ldr. Stephens, F/O. Adams, F/O. Rose, P/O. Coventry and AC. Collins.

The Army Team were:—Lt. Middleton; Lt. Miller, Lt. Baker-Jones, Pte. Jones and Lt. Palmer; Lt. Worton and Lt. Wilkinson; Sjt. Pates, C.S.M. Jones, Lt. Honeyman, Lt. Davies, Lt. Rennie, Lt. Young, Lt. Dearden and Lt. Herbert.

NOTE.—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

THE R.A.F. SPORTS BULLETIN.

(Issued in Collaboration with the R.A.F. Sports Board.)

R.A.F. Rugby Union.

The final of the Inter-Unit Cup competition will be played in London on Mar. 28 instead of Mar. 24 as previously arranged. The ground will be announced later.

Golf.

The R.A.F. were beaten by Roehampton at Roehampton on Mar. 10 by 6 matches to 3 on the day's play. They won the singles by 5 matches to 1 with 2 halved matches but lost the foursomes by 1 match to 2. The other 2 matches were halved.

The following played for the R.A.F.:—Wing/Cmdrs. Thompson and Munro, S/Ldr. Pulford, F/Lts. Hayward, Craik, Weare and Wadham.

R.A.F. Depot, Uxbridge.

A Boxing Match took place at Uxbridge on Mar. 1 between teams representing the R.A.F. Depot and the Royal Corps of Signals. Each team consisted of four Officers and eight Other Ranks and many interesting bouts were seen.

A match had previously taken place between these two teams at Maresfield when the Army Team was victorious by 16 points to 15. In the return encounter at Uxbridge they were again successful, the result being 20 points to 16 in their favour. The results of the bouts with the winners and runners-up respectively were as follows:—

OFFICERS:—FEATHER, Capt. Fox, and F/O. Horne; LIGHT, Lt. House, and F/O. Lugg; MIDDLE, Lt. Spencer, and F/O. Adams; HEAVY, F/O. Vosper and Lt. Bailey.

OTHER RANKS:—FLY, Boy Collins, and AC. Smith; FEATHER, AC. Taylor, and Boy Viney; WELTER, Cpl. Bunn, and Sgln. Dibbs; LT. HEAVY, Dvr. Smith, and AC. Garner; BANTAM, L/Cpl. Hughes, and AC. Cox; LIGHT, AC. Fanner, and Sgln. Richmond; MIDDLE, Sgln. Emblem, and AC. Jackson; HEAVY, AC. Hankinson, and Sgln. Bartropp.

Halton.

R.A.F. Association Football Cup:—The match between No. 4 Section, Halton and the R.A.F., Winchester in the fifth round of the above cup took place at Halton Camp on the 7th.

The match, from a spectator's point of view, was very unpleasant owing to the continued downpour of rain and hail right through the game. The result was a win for Halton by 7 goals to 1, the score of the home team being made by Dalrymple (3), Wardle (2), Green (1) and Cadger (1).

R.A.F. Point to Point.

The R.A.F. Point-to-Point Steeplechases will take place on Mar. 26 at Kimble near Aylesbury. Entries close on Mar. 18 with the Sec. Hunt Club, Halton House, Halton Camp, from whom entry forms and all particulars can be obtained.

1st Race (13.30 hrs.)—Adjacent Hunts Steeplechase.
2nd Race (14.00 hrs.)—R.A.F. Light Weight Steeplechase.
3rd Race (14.30 hrs.)—R.A.F. Novices' Steeplechase.
4th Race (15.00 hrs.)—R.A.F. Heavyweight Steeplechase.
5th Race (16.00 hrs.)—Farmers' Race.

A Team Challenge Cup will be presented to the Unit gaining most points in all three R.A.F. races.

PERSONAL NOTICES.

ENGAGEMENT.

HORSFALL—FULLERTON.—The engagement is announced between Maj. Ewart Douglas Horsfall, M.C., late R.A.F., only surviving son of Howard Douglas Horsfall, of Mere Bank, Liverpool, and Miss Myra Downing Fullerton, of Court House, Kineton, Warwickshire, younger daughter of the late Frederick Downing Fullerton, of Ballintoy, Co. Antrim, and the late Mrs. Frederick Downing Fullerton, of Purley Park, Reading.

MARRIAGE.

JAMISON—WILSON.—On Feb. 20 at Bangor, Co. Down, Robert McKinley Jamison, D.F.C., son of the late Mr. James Jamison and Mrs. Jamison, Millisle, Co. Down, to Dorothy Violet, youngest daughter of Sir Thomas and Lady Wilson, "Avoca," Princetown Road, Bangor, Co. Down.

BIRTH.

ANDERSON.—On Mar. 6, at Manor House, St. John's Wood Park, to Phyllis (née Joseph) wife of F/Lt. W. F. Anderson, D.S.O., D.F.C., 55 Squadron, R.A.F.—a son

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES.

For week ending Mar. 11 :—

LONDON—PARIS :

Handley Page Transport, Ltd., machines 6*, passengers 48; Air Union, machines 13†, passengers 39; Total machines 19, passengers 87.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 13*, passengers 68.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 18, passengers, Manchester-London, 24, London-Amsterdam, 6.

LONDON—ROTTERDAM :

K.L.M., machines 11, passengers 12

Total number of trips by British machines: 37, carrying 146 pas. Foreign machines: 24, carrying 51 pas.

Trips per day.—Monday, 12; Tuesday, 11; Wednesday, 8; Thursday, 10; Friday, 5; Saturday, 12; Sunday, 3.

STATISTICS.

Machines, 61; Passengers, 197; Crews, 116; Total Personnel, 313.

Corresponding week last year :—

Machines, 44; Passengers, 110; Crews, 74; Total Personnel, 184.

Corresponding week, 1921 :—

Machines, 31; Passengers, 69; Crews, 35; Total Personnel, 104.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris. (Air Union = G.E.A. + C.M.A.)

Croydon Notes.

Nearly 200 passengers were carried last week by the air liners and Handley Page Transport once again returned to the head of the list so far as passengers on the London-Paris route were concerned. The Instone Air Line carried the largest number of passengers on any route their numbers being swelled by the transport of a United Services Rugger team to Cologne on Saturday and bringing them back on Sunday.

The team left Croydon in three D.H.34s between 12.00 and 13.00 hrs. on Saturday and they arrived about 16.30 hrs. at Cologne. They left at about 11.00 hrs. on Sunday morning so quite when they found time to play a game of Rugger unless they played in the dark one does not know.

One understands that Mr. Larry Carter is to leave Handley Page Transport Ltd. shortly to take up the position of test pilot with the Bristol Aeroplane Co. It would be very difficult to find a better all-round pilot than Mr. Carter and the Bristol Company are to be congratulated heartily on their choice.

It is also rumoured that three other of the pilots of various British air lines are leaving to go to aircraft firms not primarily engaged in air transport.

One or two pilots at one time on air-line work who have since been serving in the R.A.F. are reputed to be returning to the air lines to fill the vacancies.

The night-flying experiments have now come to an end. Mr. Hubert Broad was up on the DH.9 with Mr. Biddlecombe three times during the week and made various flights along the route, going as far as Lympne and staying up for long periods. Mr. Broad tells one that cloud-flying on moonless nights is rather an uncanny experience. A cloud cannot be seen until one is right in it and then, to use a somewhat Hibernian expression, nothing can be seen at all.

Capt. Rex Stocken has been flying a "Tinsyde" on test during the week and on Saturday the "mystery" monoplane was out having its engine run. It is of Polish origin and has a Nieuport fuselage with a Le Rhône engine. The wing is all in one piece and the camber can be varied by the pilot while the machine is flying. It is understood that the machine has flown in Poland and has been acquired by Monsieur Richard for the A.D.C. A Polish pilot is coming over to demonstrate the machine in England.

A start has already been made in carrying out the improvements to the aerodrome which were recommended by the committee. A précis of the report of this committee was published last week.—G. D.

CELLON AND CERRIC.

One of the most interesting stands at the recent Trades Fair Exhibition at the White City, London, was that of Cellon (Richmond) Ltd. As is well known that firm have adapted their aircraft dope for use in civil life under the title of "Cerric." Bathroom taps so treated save all polishing troubles: wicker chairs, lacquered trays, ornaments and many other household goods are transferred from the dull to the interesting by the use of Cerric.

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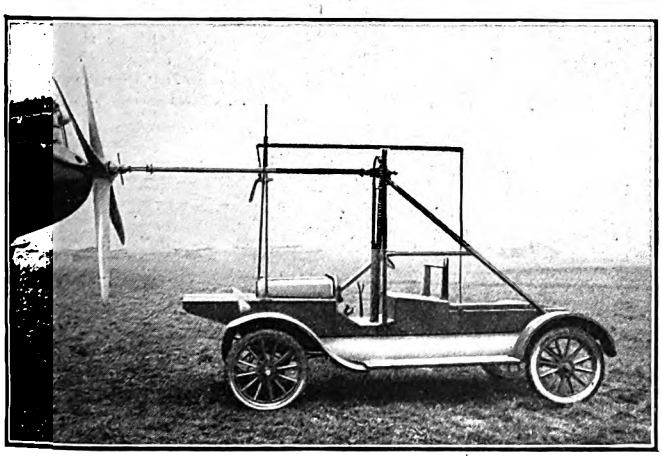
N.B.—Cellon won't wash clothes!



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PUBLICATIONS.

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THE MOST THRILLING OF WAR BOOKS is Jacques Mortane's "Special Missions of the Air," describing the dropping of spies behind the German lines. It was published at 3s. net, and is now offered at 1s. net, post free. Other interesting aeronautical books greatly reduced are "Design and Construction of Aero Engines" (published at 6s. net), now offered at 3s. 6d. post free; How an Aeroplane is Built" (published at 5s.), post free, 3s.; "£ s. d. of Flying" (published at 6s.), post free 2s.; "An Airman's Outings" (published at 5s.), post free 3s. 6d.; "Work and Training, Royal Naval Air Service" (published at 2s. 6d.), post free 1s. 6d. Post order with remittance to THE AEROPLANE, 14, Bream's Buildings, E.C.4.

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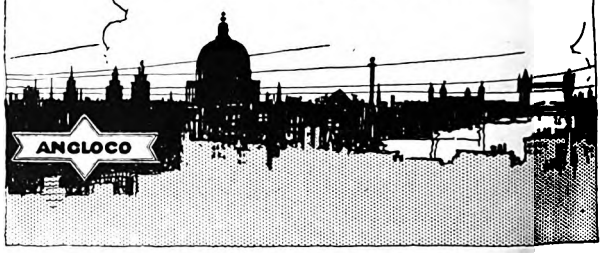

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ON THE AIR DEBATE.

Lieut.-Col. Sir Samuel Hoare, Bart., D.S.O., Secretary of State for Air, introduced his first Air Estimates amounting to £18,605,000 on Mar. 14. He pointed out that since the War the Air Force had had difficulties in connection with recruiting and training but these were being overcome and they were now getting an excellent type of recruit in adequate numbers. War huts and temporary buildings were now being replaced by permanent buildings. Referring to the occupation of Iraq he said :—"Every impartial inquirer who has been to Iraq or who has looked into this state of affairs without prejudice bears witness to the fact that this experiment in air command is working very well."

As to the operations in Iraq he made the following statement: "It has been possible to supply an armoured-car column and 16 vehicles with stores, spares, petrol and rations for 17 days entirely from the air. It has been possible to evacuate 67 persons, military and civil, by air from a point 70 miles distant in the space of little more than two hours. Only the other day, two companies of an Indian regiment, amounting to over 300 men, with Lewis guns and 30,000 rounds of reserve ammunition were taken by aeroplane to a disturbed district, 65 miles distant, within 24 hours, at a time when the roads were impassable and when it would have been otherwise impossible to move troops at all. It has been possible to mark out by the longest furrow in the World, 470 miles in length, the desert route from Amman to Baghdad, and to keep a regular service of military aeroplanes carrying mails and passengers between Cairo and Baghdad."

"Control without Occupation."

Sir Samuel summed up the whole position in Iraq in one telling phrase which deserves to pass into history as defining the basic principle of Air Power. The phrase is :—"The problem that we are trying to solve is the problem of control without occupation." He continued :—"If we can succeed in solving that problem, the effect that it will have upon Imperial communication and upon the garrisoning of various parts of the Empire cannot be exaggerated."

Referring to India he said :—"All the evidence goes to show that the value of air operations is being better and better realised. . . . The Air Officer Commanding in India has now direct access to the Viceroy, and the headquarters of the Air Force have been moved to a point in close proximity to the headquarters of the Army."

Referring to the squadrons in Turkey Sir Samuel Hoare said :—"We have the impartial testimony of General Harington as to their achievements. The air units there have succeeded, among other things, in showing that, at any rate on active service, soldiers, sailors and airmen can all work harmoniously together."

"No. 4 Squadron is a squadron allotted for co-operation with the Army. Yet 12 of its machines were erected and flown off the deck of an aircraft carrier within 53 hours of its arrival in the Dardanelles. Later on it was found expedient, with the consent of the Naval Commander-in-Chief, to detach some of the seaplanes and ship aeroplanes from their carrier ships and to place them in a shore aerodrome for co-operation with the infantry and artillery. Just as the Army unit was able to undertake naval work, so the Naval unit was able to work from land under the orders of the General Officer Commanding."

To Prevent Misapprehension.

In these instances Sir Samuel has given two very interesting examples which might be taken as proving the argument of those who claim that there should be no difference between the shore-going and sea-going personnel of the R.A.F. One would point out however that the whole of the operations in the Marmora area have been extemporised and that neither the personnel nor material of the R.A.F. have been specialised at present as they are bound to be in the near future.

Also it is well to remember that it is on occasion possible to use sailors for fighting ashore so long as they are not called to operate against a highly-trained Army and that soldiers did all the fighting at sea until Naval gunnery became somewhat of a specialised though limited subject. But those are not valid reasons for making out that soldiers and sailors might as well be the same thing. On the opposite side it may be advanced that the Royal Regiment of Marines began as soldiers stationed in the Fleet to maintain discipline (and as some believe in the hopes of improving the table manners of the ward-room). And to this day the captain's cabin on every ship is guarded by a marine sentry lest the Naval personnel should do an injury to their chief, a trifling indication that even the Navy considers a soldier more trustworthy than a sailor.

On the whole therefore one is inclined to attach less importance to this particular instance of amicable co-operation than our Air Minister himself appears to do.

Home Defence.

Turning to the subject of Home Defence Sir Samuel said that he recognised "a general feeling of anxiety, both inside and outside the House as to whether our air defence is adequate" and emphasised his opinion by saying :—"One sees that anxiety expressed day after day in the Press, and one hears it in general conversation." Then with an eye to international or at any rate inter-Allied amity Sir Samuel said, "If I make a comparison of our strength with the French strength, no one here or in France must form the impression that for one moment I believe war even remotely possible between the two Allies. . . . I quote the French figures, not because it can be even remotely imagined that hostilities could break out between the two Allies, but because France of all the Great Powers has most fully developed its air arm. . . .

"As I wish to make the problem as concrete as possible, I give the House one or two comparisons. In November, 1918, at the end of the War, the Royal Air Force was composed of 30,122 officers, 263,410 airmen and 3,300 service aeroplanes. To-day it is composed of 3,071 officers, 27,499 airmen and 371 first-line aeroplanes, that is excluding reserve and training machines; a total of 30,000 against nearly 300,000 at the end of the War.

French Strength.

"In the case of the French, it would be misleading to make a comparison of personnel as so large a part of it is provided in France from purely military personnel. The only accurate comparison, therefore, is one of machines. In November, 1918, the French had 3,600 service machines, to-day she has 1,260. The House, therefore, will see that, whilst our peace Air Service is only about one-tenth of our war Air Service, the French Air Service of to-day is one-third of what it was in 1918.

"That is, however, not the whole story, for not less than two-thirds of the British Service machines are overseas, while three-quarters of the French machines are in France. Of our 34 Service squadrons—two of which are included in the expansion scheme of which I shall speak later—18 are in Egypt, the Mediterranean and the Near East, six in India, four allocated to naval work at home, and one to Army work at home. That leaves only five Service squadrons in Great Britain for home defence. Of these five squadrons only one is a fighter and four are bombers.

"I may mention that in France there are 32 fighting squadrons and 32 bombing squadrons. Moreover, in 1925, the French programme that has already been frequently discussed in the Chamber of Deputies will presumably be completed. This will mean that whilst France will have 2,180 Service machines, we shall only have 575, even when we include the 15 additional regular squadrons.

"In 1922 200 machines, civil and military, were built in Great Britain, 3,300 in France. . . . I think the French figures are 300 civil and 3,000 military. Further, it should be remembered, in connection with the possibility of quick expansion, that, whilst the number of men employed in the French aircraft industry is about 9,250, the number employed in the aircraft industry in Great Britain is about 2,500. . . . If one great European Power has so big an Air Force and another great European Power so small an Air Force, which is right?"

Fact versus Tact.

Setting aside the wisdom of diplomatic utterances, which

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after all are only a form of political sop, the fact remains that we are just as likely to fight France within the next ten years as we are to fight any other nation in the World except Russia. It is true that such a war is extremely unlikely because France knows perfectly well that if she attacked us she would have Germany on her back at once. But allowing for the feminine factor in the composition of the Latin races there is always the possibility that France in a moment of arrogance, especially if she does succeed in enriching herself at the expense of Germany, may be foolish enough to attack this country. A treaty is only a scrap of paper whether it has been signed by France, England, Germany or any other nation. The whole of history teaches us that treaties like pie-crust are made to be broken and that a treaty is only valid so long as it is expedient.

Therefore it is just as necessary for us in the future to be in a position to beat France in the air as it was for us in the past to be in a position to beat Germany at sea. The chiefs of the Air Force know this just as well as Mr. Churchill, Prince Louis of Battenburg and Lord Fisher knew before the War that we should have to fight Germany at sea and just as well as the War Office, when five years before the War it arranged for the position of the British Expeditionary Force on the left flank of the French Army, knew that we should have to fight Germany on land.

Actually the odds are nothing like as heavy as they look on paper for the very good reason that the R.A.F. would be perfectly capable of taking on a French Air Force roughly in the proportions of 3 or 4 to 1, partly because owing to the inefficiency of the French organisation it is improbable that the French would ever get more than 10 per cent. of their squadrons off the ground together as complete formations and partly because although the French Air Force did produce a considerable number of first-class fighting pilots during the War the average effectiveness of their squadrons was very much lower than ours.

It is always well to remember that at the end of 1917 the French could only raise something less than 50 machines which could or would cross the German lines and that their death rate among pilots in training was very much higher than their death rate owing to enemy action either on the French or German side of the lines and that the German fighting pilots used to be sent to practice on the French before they were moved up to the more dangerous British section of the line. Nevertheless just as in the days when the Navy was our First Line of Defence it was necessary for us to have a ratio of two keels to one it is to-day when the Air Force is our First Line of Defence equally necessary for us to have a ratio of two fuselages to one in the air.

War Estimates.

Continuing, Sir Samuel Hoare said: "In 1913-14 the Navy Estimates were £48,809,300, and the Army Estimates were £28,220,000, about seventy-seven millions in all. This year the Navy Estimates are £58,000,000, the Army Estimates £52,000,000 and the gross Air Estimates £18,605,000, making £128,680,000 in all. In other words, the defence Estimates are already double what they were before the War."

Further in special reference to the Air Estimates he said: "Taking the net figure this year at £18,000,000, applying a one-power standard would increase the expenditure to £23,000,000 at once and to £35,000,000 eventually to keep pace with the growing programme of other Powers. For a one-power standard it may be assumed that the cost would be £35,000,000 a year net and our total defence Estimates would be over £145,000,000. The House should note this figure of £17,000,000 [35 — 18 = 17], for it will show that it is possible to increase our Air Force four-fold with an expenditure that is little more than double the present expenditure."

As to the relation of the R.A.F. to the other Services Sir Samuel said that he looked for guidance to the Committee of Imperial Defence as to the strength of the Air Force and what Imperial responsibilities the R.A.F. was to undertake and what were to be its relations to the other Services. Of the R.A.F. he said: "We must keep it an air *corps d'élite*, highly trained, well equipped and capable, so far as possible, of quick expansion," and he referred in some detail to training, research, experiment, reserves and expansion for home defence.

Admiralty Falsehoods.

As to the Admiralty complaint that the Air Council had starved the Navy he pointed out that whereas the Geddes Committee had recommended that the Naval co-operation squadrons should be reduced from six to two not only had the Air Ministry refused to make this cut but were actually increasing the Naval squadrons to eight. A great part of the air research work had been devoted to Naval work. Many of our best types had been made for Naval work and our Naval air work to-day was many stages ahead of that of any other Great Power whether in the matter of deck landings, torpedo attacks or long-distance flights by flying boats.

Other Great Powers recognised the fact as was shown by the frequent requests that we have for air information from them and by the fact that a Great Power like Japan actually came to us for instructors. He did not refer to Army co-operation work, not because he did not think it was vital but because we were asking for no extra military squadrons in these Estimates. One of the Army co-operation squadrons was at present in the Dardanelles but in spite of this we were maintaining our co-operating units with the Army at Farnborough and on Salisbury Plain and at Maresfield.

Civil Aviation.

Turning to Civil Aviation the Air Minister said that he thought that in future Civil Aviation could be a very valuable asset but he should not like members to think that Civil Aviation could be substituted for military aviation any more than the Mercantile Marine could be a substitute for the Navy. But he believed Civil Aviation could be a very valuable supplement.

Referring to the Hambling Committee he said that it had come to certain definite conclusions:—

"(1) That after three years of the existing system of Government subsidies Civil Aviation had made little or no progress. I wish to be quite clear, and the Committee wish to be quite clear, that they make no criticism of the three existing companies which have been operating this service. These companies have been doing pioneer work, and, as the figures show, they have been fulfilling a public demand. When I say that the subsidies have not proved successful, it is the system and not the companies that are wrong.

"(2) That subsidies of some kind were necessary for a further period if Civil Aviation was to continue to exist.

"(3) That two conditions were essential if the subsidies were to be of value to the nation: (a) security of tenure in the matter of subsidies and in the matter of facilities for a period of not less than ten years; (b) the subscription of a large sum of private capital, amounting to one million, as an essential condition to be carried out before any subsidy is given."

Further he said: "The only real competition comes from the French, heavily subsidised companies. France is spending 100,000,000 francs a year on Civil Aviation, and not less than 50,000,000 on subsidies. This competition will continue, whether the cross-Channel service is operated by one or more than one British company. It was on that account that the Committee came to the conclusion that one strong company would be better than a number of small companies."

Referring to the existing companies he assured the House that the Air Ministry would certainly take into account the fact that these firms have been pioneers and that it is desirable that they should have a part in any arrangement made for the future. He also said definitely: "The Air Ministry is prepared to negotiate with anyone who can fulfil the necessary conditions, and if these companies can fulfil the necessary conditions so much the better."

Unconfirmed Rumours.

This statement apparently contradicts the general impression, especially among air-line people, that the whole of the new company was fixed up as to finance and management before the publication of the Hambling Report. It also tends to dispose of the rumour that an Air Ministry official has stated that the existing lines are not entitled to any compensation for being excluded from the new company and therefore closed down.

The grounds for such a statement are said to be that never having made a profit out of their trading the existing lines have not acquired any goodwill and that as all their machines have been paid for by the Air Ministry they have no tangible assets. It is perfectly true that on this argument the existing transport companies by being closed down do not lose any profits or any prospective profits and do not lose any assets. They are in fact merely being compelled to cut such losses as they may have made in spite of the subsidy, and one is under the impression that in certain cases quite reasonable profits have been made, at any rate in certain sections of activity if not on the air lines as such. Nevertheless one feels that they should be given some reward (apart from titles) for the value of the work they have done.

Airships.

Sir Samuel Hoare then referred to airships and said that the question was now being reopened and considered by the Committee of Imperial Defence. The Admiralty were very rightly emphasising the great value which airships may have for long-distance Naval reconnaissance. The Air Ministry also thought that airships could be made available as troop carriers and possibly in the future as aircraft carriers.

From the commercial point of view he said that it might well be that airships would provide the best means of starting an Imperial air route. He very much hoped that although there was nothing in the present Estimates for airships in

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the course of the next twelve months we might be able to develop an airship policy.

A Plea for Reason.

Finally he said: "I ask the House not to be continually anxious to dig up the roots of this new organisation. I would ask them not to look back with regret, as people sometimes do, on conditions which have ceased to exist. I ask them to remember that this is a young service, young in the age of its officers and young in the period of its own lifetime.

"If hon. Members keep these facts in mind, and, without prejudice, judge the Air Force on the record of the past and by the results of what it will achieve in the next few years, I believe that it will stand successfully the highest standard of criticism that can be applied to the older Services or to any of the great Departments of State."

THE DEBATE.

Captain Wedgwood Benn, D.S.C., D.F.C. (late R.A.F.) opening the debate referred to the steadily growing agitation, he did not say inspired by the Admiralty but centring round the Admiralty, to disintegrate the Air Force. He asked the First Lord of the Admiralty about the Burney airship scheme concerning which negotiations had been going on notwithstanding the fact that during the War and after the War the Admiralty displayed very little interest in the air at all. He said that apparently the Admiralty had £250,000 to spend on this service although as Mr. Winston Churchill had said "Forty millions of money was squandered by successive Boards in building British Zeppelins, not one of which on any occasion ever rendered any effective fighting service."

He expressed surprise at the announcement that the Admiralty were retaining 140 officers and 1,000 men in anticipation of manning the air-arm of the Fleet despite the fact that Parliament allotted money and defines duties to the various Departments. It was amazing for the First Lord to announce that he was keeping men in reserve for a purpose never ratified by that House. It was the more interesting because it was not two years since the Air Ministry asked the Admiralty if they could find 100 officers who were willing to volunteer for air-work and only nine volunteered two of whom were unfit and the remaining seven were axed. He demonstrated that it was no use expecting sailors to do a little flying in their spare time.

Turning to the Air Estimates he wanted to know whether the Government was making any effort to extend the principles of the Washington Treaty to Air armaments, "this most dangerous and growing form of offence" in the same way as to the obsolescent battleship.

He emphasised the fact that the Air Staff should have complete control of air operations and recalled how in the Mediterranean during the War quantities of old trawlers were toiling away quite unable to check what few submarines there were whereas the whole work might have been done by very few seaplanes or lighter-than-air craft. He said that the patrolling of trade routes and the repelling of invasion by sea were work which should be laid on the Air Ministry.

Invasion by air must be met by bombing the munition centres and aerodromes of the enemy and not by waiting for the aeroplanes to come here. The Supreme Air Commander should be the man who is, in the last resort, in control of all things that fly everywhere. The airman should not depend for his career upon the Admiral or the General. His qualifications, ambitions, and goal should be one; his reward to serve his country in the air. He could not have his prospects of advancement jeopardised by being under the control of another Service.

Capt. Benn lamented the reduction in the expenditure on Civil Aviation and seemed still to be under the impression that aircraft factories could be kept going on orders for civil aircraft. Continuing, he said that the real problem for the Air Ministry is how to teach the people of this country to regard the air as being as much their element as the sea now is.

Major-General Sir Frederick Sykes speaking for the first time in the House on the question of National and Imperial Defence said that a sound defensive air system was indissolubly linked with international affairs and social reform. He stated that the safety of the Empire now rested not on one of the three Services but on the corporate co-operation of the three Services in one. Treasury control over the finance of the three Services required readjustment.

The logical conclusion was that there should be unity of control for the three Services. That could not be done very soon but many steps could be taken in that direction. One was that the senior staffs of the three Services should have a very much greater degree of education in joint Service work than they are getting. Although he welcomed the new Air Staff College he thought it was more important that there should be a unified joint Staff College of the senior officers of the three Services.

On this point one is entirely in agreement with General Sykes. If only the Admiralty could be induced to send young post captains to such a joint College instead of sending to their own war college senior officers who are on the verge of retirement it might be possible to instil some sense even into the Navy. One believes that actually the Naval officer is not unintelligent he is merely uneducated and contact with the more intellectual Services would make a very great difference to him.

Continuing, General Sykes said that the Navy and the Army had a very strong case in favour of having their own Air arms. But the Air argument was also very strong and he thought that we ought to concentrate first of all upon the independent Air arm. If the Navy and the Army got their own tactical units there might be a desire in some quarters to dispense with the development of independent long-range air action.

He suggested tactfully that the R.A.F. were not doing enough flying and said "The only way air progress can be achieved is by flying, and with your experiments you want to carry out the greatest amount of practical useful flying." As to commercial flying its value lay not only in the reserve powers of the industry but in the experiments which it helped to foster.

He hoped the Air Ministry would work in with the Admiralty scheme for a new Naval base at Singapore. Not only would such a place be of great value to the Service but it would greatly assist a commercial air route to Australia.

The whole of General Sykes' speech was thoroughly sound and showed that foresight and intellectual grasp of his subject for which he has always been notable. Few people who have had to do with aviation have had such a clear view of the present needs and future possibilities of aviation as General Sykes and the fact that he has for some curious psychological reason been unable to put into practice the excellent views which he holds in theory is one of the tragedies of British aviation.

Mr. Amery, First Lord of the Admiralty, congratulated General Sykes on a maiden speech which was a valuable contribution to a vitally important subject. Mr. Amery said that Capt. Benn was undoubtedly under a misapprehension possibly owing to what he had seen in the Press or even to the utterances of Commander Burney. The Admiralty had certainly come to the conclusion that airship reconnaissance might be of great value in economising the work of light cruisers and it had decided that it was worth paying for. As to the thousand men and 140 officers he explained them by pointing out that three large aircraft carriers would be ready in the coming year and that there would be a considerable expansion in that Service. This ingenious explanation hardly seems to agree with his own statement in print a few days earlier.

Mr. J. Batey (Member for Spennymoor) moved an amendment to the effect that immediate steps should be taken to eliminate unnecessary expenditure consequent upon duplication of staffs or the elaboration of various and competitive plans dealing with the problems of air defence over land and sea.

He advocated the closer co-operation of the three Services under the Committee of Imperial Defence. He said that the Admiralty thought too much in terms of one big fleet fighting another big fleet, that the War Office thought in terms of an immense Continental army, and that the Air Ministry seemed to think too much in terms of mass bombing. One would feel inclined to sympathise somewhat with his views but for the fact that he also said that the aim of the Air Ministry ought to be to build up Civil Aviation so that it can become what the Mercantile Marine has been to the Royal Navy. He said that he and his friends who were backing his amendment believed this to be the best and cheapest method of training a large number of men to fly and he quoted some evidently misguided friend of his saying that ninety per cent. of the requisite training could be given to the men by encouraging Civil Aviation.

As against this however he showed enlightenment in being opposed to subsidies for private companies and said a much better way is for the Government to nationalise the Air Service and fly the machines themselves. This in fact is what the Canadian Government has been doing, with the proviso that it is always prepared to withdraw its national civil air service when any private company shows itself competent to take over the work.

He also made some vague remarks about believing that research might discover defensive methods against air attack other than fighting in the air. One suggests to Mr. Batey that the best form of defence is that which has already been prepared by the Air Staff, namely the formation of bombing squadrons which will prevent invasions by making it impossible for the enemy's offensive aeroplanes to leave their aerodrome. Moreover he thought that it ought to have been

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possible for the Air Ministry not to increase expenditure and that instead of having promised 15 new squadrons for home defence they ought to bring home 8 squadrons from the Middle East.

He then proceeded to dilate on the statements under the name of Sir Percival Philips which appeared in the *Daily Mail* on the subject of the R.A.F. in Iraq and made the extraordinarily foolish suggestion that the Air Ministry ought to have replied in the *Daily Mail*. On which Sir Samuel Hoare intervened to explain that the right place for an official denial was in the House of Commons and not in the Press. Over and above this Mr. Batey suggested that our alliance with France was quite sufficient reason for not having a bigger Air Force. Altogether barring one or two flashes of sense he made a singularly silly speech which merely showed his lack of knowledge of history and of experience of humanity.

Mr. S. H. Rose (Member for Aberdeen North) seconded Mr. Batey and devoted the first part of his speech to pouring rather feeble ridicule on Commander Burney's very vulnerable airship scheme at the conclusion of which he said that he thought it was not worth while to spend money on airships and that he did not believe that Civil Aviation had more than very limited potentialities. He thought that the latter might be made a luxurious and costly mode of travel for a very few rich people but he did not believe it could be brought into use for general transport and it could not do a great deal with mails.

He advanced the extraordinary theory that the only way to resist the force of gravity was by the exercise of "prodigious and unremitting centrifugal force." This statement will probably interest our scientists very nearly as much as the vortex theory which Capt. Sayers introduces to the readers of THE AEROPLANE this week.

Nevertheless Mr. Rose had the common sense to state that the aeroplane is going to be an important arm of the Services. He forthwith proceeded to spoil this evidence of sanity by saying that he viewed with the greatest alarm a number of aeroplane engineers making any sort of things they like, standardising against each other and against the Government.

He said :—"I want to know why that Farnborough factory cannot be more fully developed. You are not getting out of it what you might get. It was a well-equipped place until you formed the Air Ministry—I do not know what the Air Ministry has done with it—but you can do a great deal there, and what you must determine is type more than anything else. Then you must standardise and see that no one standardises against you.

"Most of us on this side of the House believe that private enterprise in munitions of war of all sorts and kinds should cease as soon as we can cause them to cease. We do not believe in individuals having the right and the privilege of making murder mechanism to sell to anyone they like in any part of the World, and we believe one of the first steps towards possible peace in the World is to stop this sort of thing, and for that reason we urge that the defence of this country, in so far as it needs mechanism and in so far as it needs munitions and death-dealing apparatus of any sort or kind, should, as far as possible, be done under Government auspices."

Evidently Mr. Rose had no knowledge of aircraft during the War and has acquired none since. If he had had he would have known that premature standardisation at the Royal Aircraft Factory at Farnborough cost us hundreds of valuable lives during the War when dozens of our standardised aeroplanes were brought down by the constantly-improving German aeroplanes. If he had any knowledge of present day aeronautical engineering he would know that we are just as far to-day from standardisation of aircraft as Nelson's *Victory* is from the pre-war battleship. And even the pre-war battleship is a very long way from the *Hood* and the new battleships which are now being built. If Mr. Rose knew anything about Naval engineering he would know that the greatest advances in warship design have been made by private firms building for foreign countries and not tied down by hide-bound Admiralty notions.

If we adopted his imbecile suggestion we should merely find ourselves at the beginning of the next war with a big Air Force mounted on obsolete standard machines. The Air Ministry's present policy of fostering competition and enterprise in the Aircraft Industry has resulted in our already being far ahead of other countries in many phases of aircraft design and the maintenance of the same policy will keep us ahead in spite of the obstructive methods of certain technical sections in the Air Ministry.

Furthermore Mr. Rose said :—"You will never have peace as long as you let people make things of this kind and sell them to whoever they like in any part of the World, as long as you connive in the export or the import of contrivances for death and destruction."

Passing over the grammar of the idealistic Mr. Rose one cannot understand any sane being believing that it is possible to abolish war by abolishing armament. If armaments were abolished people would still fight with sticks and stones or their bare hands and if we abolished armament we should merely leave ourselves open to attack by other countries who have not abolished armament.

Both Mr. Batey and Mr. Rose are Labour Members and one can make every allowance for their ignorance because of their obvious lack of education. But having oneself worked at the bench alongside British workmen for a good many years one knows perfectly well that at heart the British workman is no more inclined to permanent peace than is a Balkan bandit or a Mongolian Chunchuse and even if he were so inclined his pacificism would only make all the easier his ultimate conquest by the said bandits.

Lord Hugh Cecil (late R.A.F.) gracefully chaffed the two previous speakers on their diametrical opposition to one another on the subject of Civil Aviation. He said that he thought it was almost the first time that House had had an amendment moved and seconded in speeches which had little or nothing to do with the amendment but were contradictory of one another.

He pointed out that the Air Force had two sides to its activities, that of policing our non-European Empire and that of taking part in a great European war. He said that as regards the latter if you cannot make effectual provision you are making a provision which is confessedly less than effectual. He found it difficult to understand why we make preparation which is sufficiently large to be costly and not sufficiently large to be efficient.

He pointed out that aeroplanes were not sufficient defence against hostile aeroplanes and that the only deterrent to attack was the danger of retaliation. He strongly advocated closer co-operation between the three Services either by way of a Ministry of Defence, or perhaps by a common General Staff or similar method. He did not think a Ministry of Defence would be created immediately or in the very near future but that it was essential to retain quite unimpaired an independent organised Air Force.

He abolished the idea of sending Naval officers to be trained for Naval aviation by the R.A.F. saying that to be efficient airmen their training must extend over years rather than months and that when they went back to the Navy they would find a great lapse of sympathy between them and their Naval commanders. The Navy would dislike them and the old joke would apply again about the R.N.A.S. which was said to stand for "Really not a Sailor." The result would be a small body without the strong professional atmosphere of the R.A.F. partly composed of disappointed disgruntled enthusiasts and partly composed of disheartened failures. The professional unity of the Air Force must not be broken.

Lieut.-Colonel J. T. C. Moore-Brabazon, M.C. (late R.A.F.) again drew attention to the fact that the Secretary of State for Air is still not a Member of the Cabinet and that the three Services were not on an equal footing. He emphasised the fact that Signor Mussolini considered the air was so important that he had taken over the job of Air Minister himself.

He said that he agreed thoroughly with the Amendment because you could say anything on it and the Proposer and Seconder had contradicted themselves all the way through. That resolution should have been put down for another Service because it has always been the ambition of the Air Ministry to do exactly what was suggested, that is, to spend money on the basis of what you could get for your money.

Every effort must be made for defence against aircraft. Many things were possible. For instance we had not explored the possibilities of the manless aeroplane directed by wireless.—Col. Brabazon forgets the amusing experiments at Farnborough and Northolt related in THE AEROPLANE not long ago.

He said that General Sykes' speech must be considered with respect. The only advantage that he, Col. Brabazon, could see in Civil Aviation was that it gave you manufacturers ready to build with the necessary despatch when wanted. Herein one disagrees with him. Money spent on Civil Aviation goes on running expenses and not on new machines, as was demonstrated in this paper recently.

Continuing he said that one could not help admiring the Admiralty. What they wanted they generally got. They had had amazing propaganda. He did not know how it was done. It was not shown in the Votes. Sometimes it seemed to come under the head of what is called "hard lying money." At any rate they knew that last week when the Estimates were coming up the Press was flooded with the Admiralty side of the question of co-operation.

The question of whether the Navy was going to have its own Air Force was becoming a hardy annual. There had been inquiries by experts and the thing had been decided. Personally he had so much faith in the answer that he did not mind whether there was an inquiry once a week for the next

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

In a series of articles which begin below it is proposed to attempt to outline recent progress in the theory of aerodynamics, particularly as regards the aerofoil.

Readers with the necessary mathematical knowledge will find the expositions of this theory, which have been published in Germany and elsewhere, much more satisfying than the very rough outline which alone is possible in these pages. But so far very little has been done to explain the main points of this theory to those of limited mathematical knowledge. This is only natural, for the simple reason that the theory is essentially a mathematical one and it is so very difficult indeed to form a clear physical concept of what is actually happening round a wing.

It is therefore inevitable that this series of articles will give many loop-holes for the criticism of those to whom the theory is familiar. The criticism is worth risking if the articles help in any way to a better understanding of the advances which have recently been made in this branch of knowledge.

An interesting item of news is the description in this issue of the first aeroplane to be built in Austria since the end of the war.

VORTICISM IN AERONAUTICS.

Thanks very largely to the very painstaking work of a group of German scientists since the outbreak of war there has been during the past few years a very considerable advance in knowledge on the subject of the aerofoil and its behaviour

This advance in knowledge is undoubtedly of the very first importance—it is the beginning of a rational explanation of what had before been a very puzzling set of phenomena, and although the theory of aerofoils is admittedly far from complete, it is already in a state sufficiently advanced to make it possible to predict and to calculate certain results which previously could only be attained by direct experiment.

The Practical Value of Theory.

Not only has this new knowledge produced this result, but it has given a means of analysing experimental results in order to separate—at least to some extent—the influence of particular experimental conditions from the more general results which the experiments are intended to demonstrate.

For instance when models are tested in a wind-channel there is a disturbing influence caused by the proximity of the channel walls.

This influence depends on the type of channel used and on the relative size of the model and the channel itself.

In many cases the result of this particular type of interference is unimportant. In some cases, particularly where the model is large and the tunnel small it may be extremely important.

Take for instance the effect of aspect ratio on the properties of an aerofoil. To discover this by direct test in the wind-channel tests would be made on a series of models of the same chord but of increasing span, generally in the same wind-channel.

As the span of the model increases so does the importance of the channel wall effect and tests so made do not show the effect of the change of aspect ratio only—but that of aspect ratio plus the interference effect. And as a result tests of this nature have been of very limited value—and in some cases distinctly misleading.

Aspect Ratio and Interference.

Theory—as now developed—allows the calculation of the result of aspect ratio change and of wind-channel wall interference separately. The calculations agree very closely indeed with the model tests and one may now safely conclude that the effect of a change of aspect ratio on the qualities of any wing section can be calculated accurately from the results of tests on a single model of that section.

The mutual interference of two or more wings can also be calculated by means of the modern theory of aerofoils. It is not so far established that the theory is in as complete agreement with experimentally determined facts as it is in regard to aspect ratio.

But it is in very fair agreement and it gives order and sequence to a large number of experimental results. As a result it is now certainly possible to estimate with very fair accuracy from a test on a single monoplane model the qualities of biplanes and multiplanes of any gap/chord ratio stagger, or decalage. It is possible to estimate the effect of a combination of wings of different spans, chords, angles of incidence or even different sections from tests on one monoplane model of any aspect ratio of each section involved.*

Influence on Design and Research.

This work has a twofold value. It greatly reduces the amount of direct experimental work needed in the wind-tunnel for design purposes. The designer of a biplane or a triplane need no longer wait for tests on model biplanes or triplanes—he can go ahead with the results of monoplane tests with a fair degree of confidence—for the deficiencies of the theory in its present state do not in all probability lead to errors as serious as those which may be involved in the translation of model results to full-scale estimates.

And, in the second place it gives some sort of direction to pure research work. Experimental results begin to fall into some sort of order and the problems to be solved assume relatively definite aspects. This should and will make for much more rapid progress towards a really thorough understanding of the very complicated phenomena involved in aerodynamics than was in any way possible when experiments were merely shots in the dark, and results were purely records of unconnected observations.

To attempt to give any sort of a complete account of the theory of the aerofoil in its present state in this paper is quite impossible—even if the present writer felt competent to undertake the task, which he does not. The most which it is possible to do here is to give a very brief outline of the history of the subject, to state roughly the physical assumptions on which the theory is founded and to draw attention in the most general way to some of the results to which it has already led.

Dangers of the Undertaking.

From many points of view this is a most dangerous undertaking. The subject is a most complex one. The new theory of aerofoils has been developed in mathematical form, and the mathematics involved are of a formidable complexity.

Some competent authorities—particularly in this country—raise what are claimed to be serious objections to the theory on mathematical and physical grounds, and these will doubtless hold that the present effort is a case of "rushing in where angels fear to tread."

But as these same authorities admit themselves that the theory does give results of surprising accuracy for which they cannot account, one may feel emboldened to risk their contumely—if thereby it is possible in any way to give even the roughest outline of this theory to those to whom the mathematical exposition is incomprehensible, or can draw the

* General Biplane Theory. By Max M. Munk. Report No. 151, United States Advisory Committee for Aeronautics, Washington, 1922.

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attention of those more mathematically minded to a subject which has received probably less attention in Britain than in any civilised country of the world.

Historical Aspects.

Although the fact that there is a definite resistance to the motion of any body in any fluid—particularly air and water—has been known to man from time immemorial the exact manner in which such resistances are produced has not even yet been explained in a completely satisfactory method.

Newton's Fluid.

Newton, by assuming a special form for a fluid, accounted for the existence of resistance, and even the existence of a transverse force of the nature of the lift of an aerofoil. Newton's fluid was assumed to be composed of innumerable small particles of no sensible magnitude, uniformly distributed in space.

If such a medium is in motion past a solid body, or if the body moves in the medium, the body is subjected to a continual bombardment by the particles of the fluid, and momentum is communicated, to the body in one case and to the particles in the other. The resistance experienced under these conditions will depend upon the elasticity of the particles and on that of the body. If both are perfectly elastic each particle will bounce off the body with an equal but opposite velocity to that with which it strikes the body.

If on the other hand either body, or particles, are perfectly inelastic, there will be no bouncing. In the first case the resistance will be twice as great as in the second case.

The Newtonian theory leads to a resistance varying as the square of the speed—which is fairly close to the truth—but even for the perfectly inelastic condition it gives values for resistance very considerably greater than those found by experiment.

The failure of this theory is due not to any defects in the theory itself, but to the assumption that a fluid might be represented as a collection of separated particles.

Modern Hydrodynamics.

The science of hydrodynamics—based on the works of Euler, Lagrange, Stokes and other famous mathematicians—attempted to elucidate the problems of motion in a medium very different from that of the granular fluid of Newton. The fluid of hydrodynamic theory is of absolutely uniform consistency, and if in some respects this "fluid" more truly represents the fluids which exist in nature than Newton's granular fluid there are certainly other respects in which it is an equally artificial hypothesis.

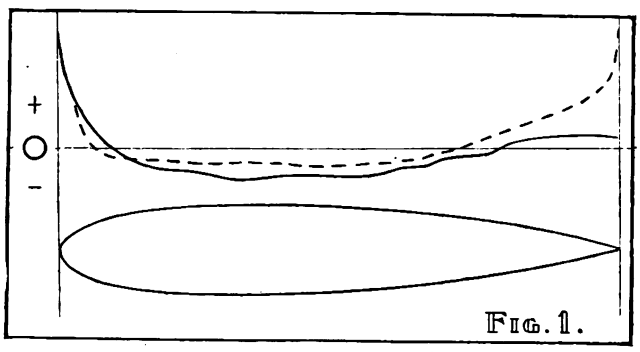

Fig. 1.

Real fluids are certainly not of absolutely uniform consistency—there is some degree of "granularity" present—but equally they are not composed of the free and disconnected particles assumed in the Newtonian medium. That is to say that a particle of a free fluid does not bounce off a body without disturbing other fluid particles in its vicinity.

The essential property of a fluid—its "fluidity"—is that it is incapable of sustaining shearing stresses—or in other words that it will bear distortion without developing any resistance to that distortion.

Ideal and Real Fluids.

If this quality is complete the fluid possesses no viscosity. Real fluids are all imperfect fluids—they do possess viscosity and they do resist distortion, and the fluid of hydrodynamics does not accurately represent any real fluid on that account.

Mathematical research into the motions of the perfect non-viscous fluid lead to certain fairly definite results. It was possible by certain ingenious devices to calculate the form of the flow round bodies of almost any shape moving in it, and from the form of the flow to calculate the fluid pressure which would be developed at any point on such a body.

In many cases the form of flow calculated from the theory was very closely similar to that actually observed in real fluids with similar bodies. Experimental measurements of the real pressures developed gave a very close agreement with the calculated ones to within certain limits.

In fig. (1) the dotted line shows the calculated pressure on the surface of an airship model of the shape sketched below the curve. The full line shows pressures actually measured. There is a striking similarity between the two curves, except at the tail of the model. Unfortunately this apparently small difference is of the very greatest importance.

All pressures on the model ahead of the maximum diameter where the surface is inclined outwards from the nose have a component directed backwards on the model resisting its motion. All those behind the maximum diameter, where the surface slopes in the opposite direction have a component in the opposite direction.

In the theoretical case all these components parallel to the length of the airship balance out and there is no resistance at all.

As the pressures at the tail in the real fluid are considerably less than those calculated for the ideal fluid, it is obvious that in this case the fore and aft pressure components do not

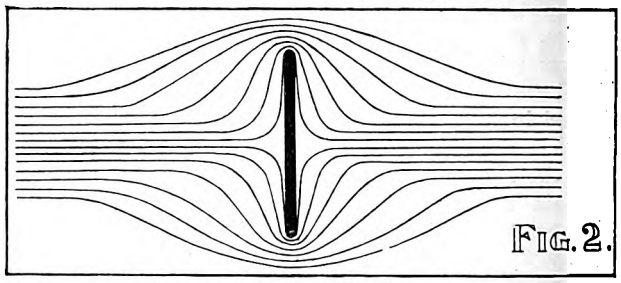
Fig. 2.

balance out—and there is a definite resistance in the case of the real fluid.

The Breakdown of Theory.

This is a typical case. In general in the ideal fluid of hydrodynamics there is no such thing as resistance. In every real case there is a resistance.

Some part of this resistance can at once be traced to the viscosity of the real fluids. The fluid does not assume its full velocity immediately outside the boundary of the body, but there is a thin layer in which the velocity changes from that of the body to that of the stream. In this layer slipping occurs, accompanied by resistance analogous to frictional resistance.

But the force caused in this way is strictly parallel to the surface of the body and has no component at right angles. It does not therefore alter the pressure at right angles to the body and over and above this skin friction resistance there is still the pressure above mentioned.

By a fundamental theorem of hydrodynamics, in fact as a direct result of the principle of the conservation of energy, changes of pressure of the type here encountered can only be accounted for by changes in the velocity of the fluid stream. A region of high pressure is a region of reduced velocity—and vice versa.

Obviously the difference between the non-viscous fluid of theory and the real fluid is that the velocity of the flow in the real fluid is not that which would occur in the theoretical fluid. But up to the present it has not been possible to calculate the nature of this change which occurs as a result of the imperfect fluidity of real fluids.

When one comes to the case of surfaces exposed otherwise than edge-on to the flow of a fluid, it is a matter of common knowledge that a pressure is developed at right angles to the surface. It is such a pressure which accounts for the lift of an aerofoil

The theoretical form of flow past a flat plate at right angles to the stream in the non-viscous fluid of theory is something like that shown in fig. 2. The streamlines are symmetrical on both sides, and there is a negative pressure on the back of the plate precisely equal and opposite to the positive pressure on the front. The total force is zero. This is again typical. Accordingly there can be by this theory no such thing as the lift of an aerofoil.

A Modified Theory.

As long ago as 1847 Stokes realised that some effort should be more to remedy the utter failure of hydrodynamics to account for the observed facts of fluid resistances. He suggested that flow might be discontinuous, and his suggestion was taken up and investigated by Helmholtz and others.

The theory of discontinuity assumed that the streamlines past a flat plate might take a form such as is shown in fig. 3, and instead of closing in at the back of the plate might be separated by a relatively large piece of fluid as a whole stationary relative to the plate, though necessarily in some state of turbulence. This theory accounts for the development of pressures such as are known to exist. It was

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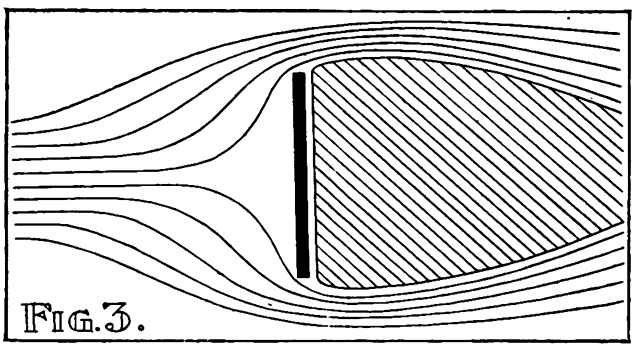


Fig. 3.

attacked by certain very high authorities on theoretical grounds, but it is certain that a flow very much of the supposed type does actually occur in nature—and is extremely marked in the case of bodies of bad shape—that is to say of high resistance.

But the theory entirely fails to account for the forces actually measured on inclined planes and on wing sections at ordinary angles of incidence. The lift forces measured experimentally are very much greater than can be accounted for by the theory of discontinuity.

Also the form of flow actually observed in these cases does not resemble that which would follow from the theory.

Thus it is fair to say that—up to this stage at any rate—theory had entirely failed to account for either the resistance or the lift of aerofoils. Within certain limits it was possible to account for resistance, both of aerofoils and of other bodies, as a direct result of friction due to the viscosity of the real fluid, but the measured total forces on many bodies greatly exceeded anything traceable to that cause.

The credit for having been the first to point a way out of this *impasse*—so far as the behaviour of aerofoils is concerned—undoubtedly belongs to Mr. F. W. Lanchester, who in 1908 published the foundations of the vortex theory of aerofoils in a remarkably advanced form in the first volume of "Aerial Flight." His work in this direction actually dates from 1894, and in the main was presented to the Physical Society of London in a paper in 1897. This paper was rejected, and in this country at any rate his work has been treated with a totally undeserved contempt by the leading aerodynamical authorities.

In Germany on the other hand it has been recognised as of the utmost importance and it is only fair to him to say that the modern theory of aerofoils is Lanchester's theory in all essentials, and is so acknowledged in Germany.

It has been very greatly amplified, and an immense amount of extremely brilliant work has been necessary to bring it to its present state. Proffs. Prandtl, Betz and Munk—to mention only a few—deserve every credit for having rescued Lanchester's work from the oblivion to which the British aerodynamicists were willing to consign it and for having developed it into a useful and useable form, but they have no claim to be in any way originators thereof.

(To be continued.)

THE INSTITUTE OF AERONAUTICAL ENGINEERS.

At the annual general meeting held on Friday, Mar. 9, certain formal business, such as the reading of the Report of the Chairman of the Committee, the adoption of a slightly amended version of the rules, and the passing of the accounts for the previous year was performed without incident.

After these proceedings the President, Lt.-Col. J. T. C. Moore-Brabazon, M.C., M.P., read a presidential address wherein the year's progress was briefly considered, and thereafter gave a lecture on Aerial Photography.

This lecture gave in outline the history of the development of Aerial Photography in the British Air Service during the war, and was of a most interesting nature. No report of the lecture is at present available, but all who are in any way interested in this subject should secure a copy of the Minutes of Proceedings, in which this lecture will be reprinted.

THE INSTITUTE OF TRANSPORT.

The Fourth Dinner of the Institute of Transport will take place at the Savoy Hotel, London, on the evening of Thursday, May 3. Ladies are to be invited.

The Institute will hold its third Annual Congress at Sheffield on Thursday, Friday and Saturday, June 14, 15 and 16. Full details will shortly be available. An influential Congress Committee has been formed. The Local Honorary Secretaries are :—Messrs. W. H. Causer (L. & N.E. Rly.), J. Smith (L.M. and S. Rly.) and W. H. Breach (Aire and Calder Navigation), and their address is London, Midland and Scottish Railway, Wicker Station, Sheffield.

AN AUSTRIAN AEROPLANE.

The machine hereafter described has a special interest in view of the fact that it is said to be the first aeroplane to be constructed in Austria since the conclusion of peace. No information is available as to where the machine was built, but it has been constructed to the designs of Herr Theodor Hopfner, and is known as the Hopfner S.1.

The machine is a three-seater sport and joy-riding machine, fitted with a Fiat-built Mercedes engine of 100 h.p.

It is a simple cantilever monoplane—timber-built with no very striking features.

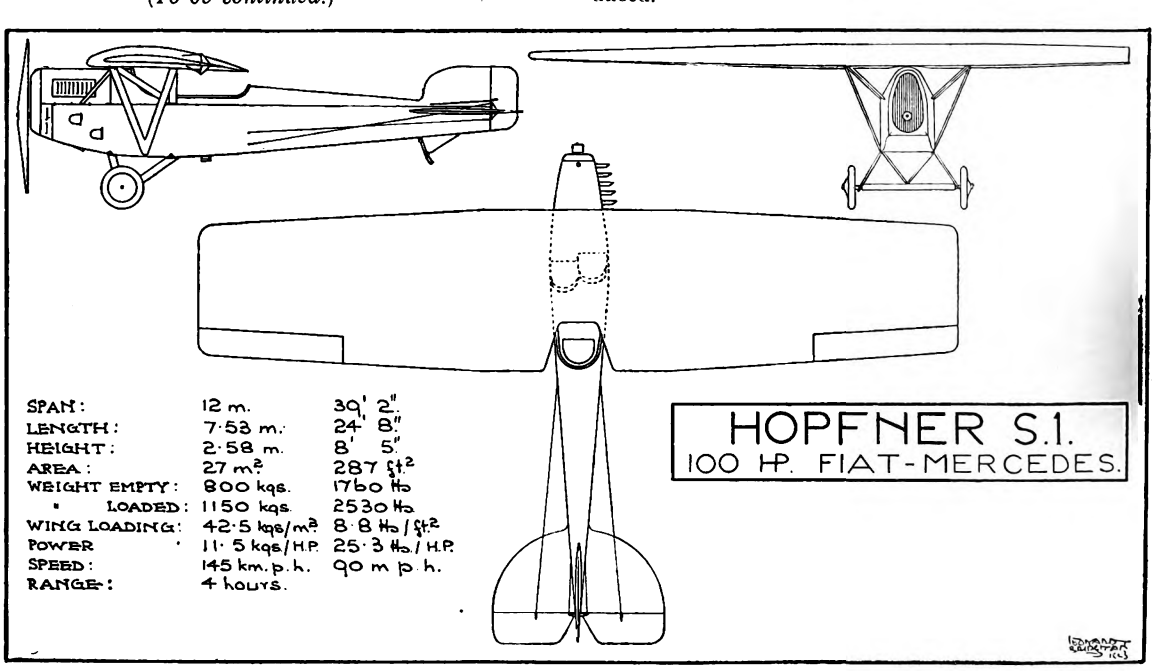
The fuselage is of rectangular section, built on four ash longerons and covered with three-ply. The engine is carried in the nose and very completely cowled in, the cowling top line being level with the lower surface of the wing and extending back past the leading edge to the front spar. There is a long open cockpit, extending from just below the front spar to the line of the leading edge, and containing two slightly staggered seats for passengers forward, and a central seat for the pilot aft.

The wing is of a thick section supported from the fuselage on steel-tube cabanes of a form very similar to those used in the war-time Fokker cantilever machines.

The wings taper considerably both in chord and thickness, and are plywood covered.

The tail is of the normal type, and is entirely built of steel-tube fabric covered. The undercarriage is of the usual Vee type and built of faired steel tube.

Dimensions, etc., are given on the scale drawing reproduced.



SPAN:	12 m.	39' 2"
LENGTH:	7·53 m.	24' 8"
HEIGHT:	2·58 m.	8' 5"
AREA:	27 m²	287 ft²
WEIGHT EMPTY:	800 kgs.	1760 lbs
LOADED:	1150 kgs.	2530 lbs
WING LOADING:	42·5 kgs/m²	8·8 lbs/ft²
POWER	11·5 kgs/H.P.	25·3 lbs/H.P.
SPEED:	145 km.p.h.	90 m.p.h.
RANGE:	4 hours.	

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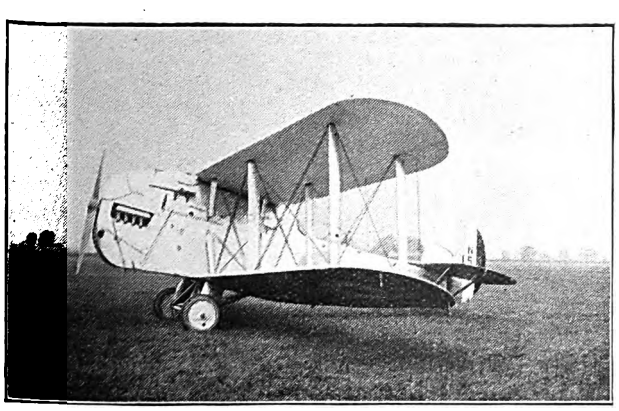
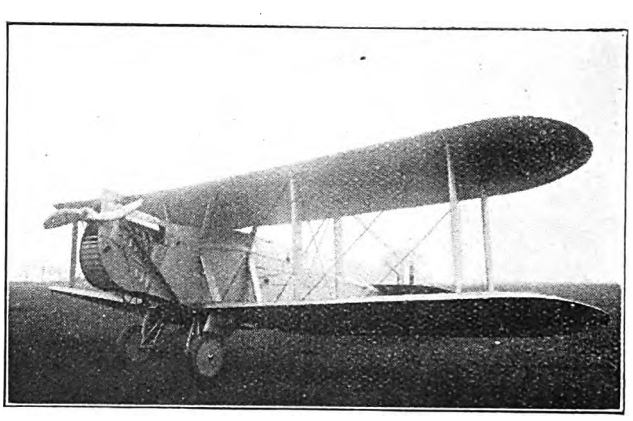


"BLACKBURN" FLEET SPOTTER.



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CLAIMS AGAINST THE U.S.A.

The Joint Anglo-American Commission which is considering the claims of British Aircraft manufacturers in respect of the use by the American Government of their designs is now sitting.

On Monday, Mar. 12, a claim by the Bristol Aeroplane Co. in respect to the Bristol "Fighter" was heard. It was stated that the American Government decided to order 2,000 of these machines from the Curtiss Co. In the course of construction great alterations were embodied in the original design—chief among them being the fitting of the Liberty engine which was some 400 lbs. heavier than the original engine.

Witnesses testified to the fact that the American technical officers concerned refused to listen to the advice of English advisers and were entirely confident of their own ability greatly to improve on the original—with disastrous results.

The Court reserved its decision.

On Tuesday, Mar. 13, the claim of A. V. Roe and Co. Ltd. for £1,000 as compensation for the communication of patents and designs was heard. It is understood that the proceedings consisted merely of a recital of the facts of the case. The decision was again reserved.

On the same day the claim of the Sopwith Aviation and Engineering Co. was heard. It was stated that in 1917 the United States Government asked the plaintiffs to quote a lump sum for the provision of drawings, etc., of Sopwith aircraft plus a rate of royalty on all machines built to Sopwith design. The company quoted £40,000 plus a royalty of 12 per cent. on machines built.

The British Government however intervened and agreed with the U.S. Government that all drawings should be supplied free, and that the British Government would settle terms with the company.

The Sopwith Co. claimed that as a consequence they had received no payment for the use of their designs by the U.S.

It was declared for the U.S. Government that there had been no user of the Sopwith drawings and designs except for purely experimental purposes and that none of their drawings or designs had been communicated to American manufacturers. On behalf of the British Government it was contended that the claim made by the Sopwith Co. was excessive. The decision in this case also was reserved.

THE "COUPE D'AVIATION ZENITH."

An international competition has been organised by the Aero-Club de France for a trophy and prize-money amounting to 135,000 francs subscribed by the Société du Carburateur Zenith.

The cup will be competed for for three years and is limtied to machines whose petrol consumption will permit them to make two flights Paris-Lyons and Lyons-Paris on 275 kilogs. of fuel. The average speed over the two return journeys must not fall below 70 km. p.h.

The winner of the competition will be the machine which covers the course with the least consumption of fuel per kilog. of useful load carried.

The winner each year will receive a sum of 30,000 francs and a bronze replica of the Zenith trophy. Five other prizes of 5,000 francs, 3,500 francs, 2,500 francs and two of 2,000 francs will be awarded to the second to the sixth placed machines.

For 1923 the Coupé Zenith will take place on July 21-22 from Orly Aerodrome, near Paris.

Entries which must be accompanied by an entry fee of 1,000 francs per machine, of which 500 francs will be returnable to bonâ-fide starters, must be received before June 1, 1923, by the Secretariat de la Commission d'Aviation de l'Aéro Club de France, 35, Rue François 1er, Paris, from whom entry forms and full particulars may be obtained.

CONTROL AT LOW SPEEDS.

The lecture given by Prof. B. M. Jones before the Royal Aeronautical Society on Thursday, Mar. 15, on "The Control of Aeroplanes at Low Speeds" was frankly of a very disappointing nature.

Prof. Jones is Chairman of the Panel of the Aeronautical Research Committee, which is charged with the investigation of stability and control, and considering how much stress was laid by the Director of Research at the Air Conference on the fact that it had been found possible to control aeroplanes at large angles of incidence it was expected that the lecture would disclose a good deal that was novel and interesting.

Prof. Jones announced that the work on this subject had been going on for three years. As a result of that work—which included much wind-tunneling—the committee had discovered that the reason why a stalled aeroplane spun was not that the ailerons could not overcome the rolling moment due to the spin, but that they caused a large yawing, or turning, moment which the average rudder could not overcome.

The three years of work—in addition—had given them a number of figures relating to the controllability of certain machines when stalled, and they had been able to predict that a Standard Avro would be just about controllable when stalled, and that a Bristol Fighter had only about one-third the rudder control necessary in those conditions.

Tests with the machines confirmed the predictions, and experiments showed that by fitting very large rudders a skilled pilot could glide at angles far above stalling.

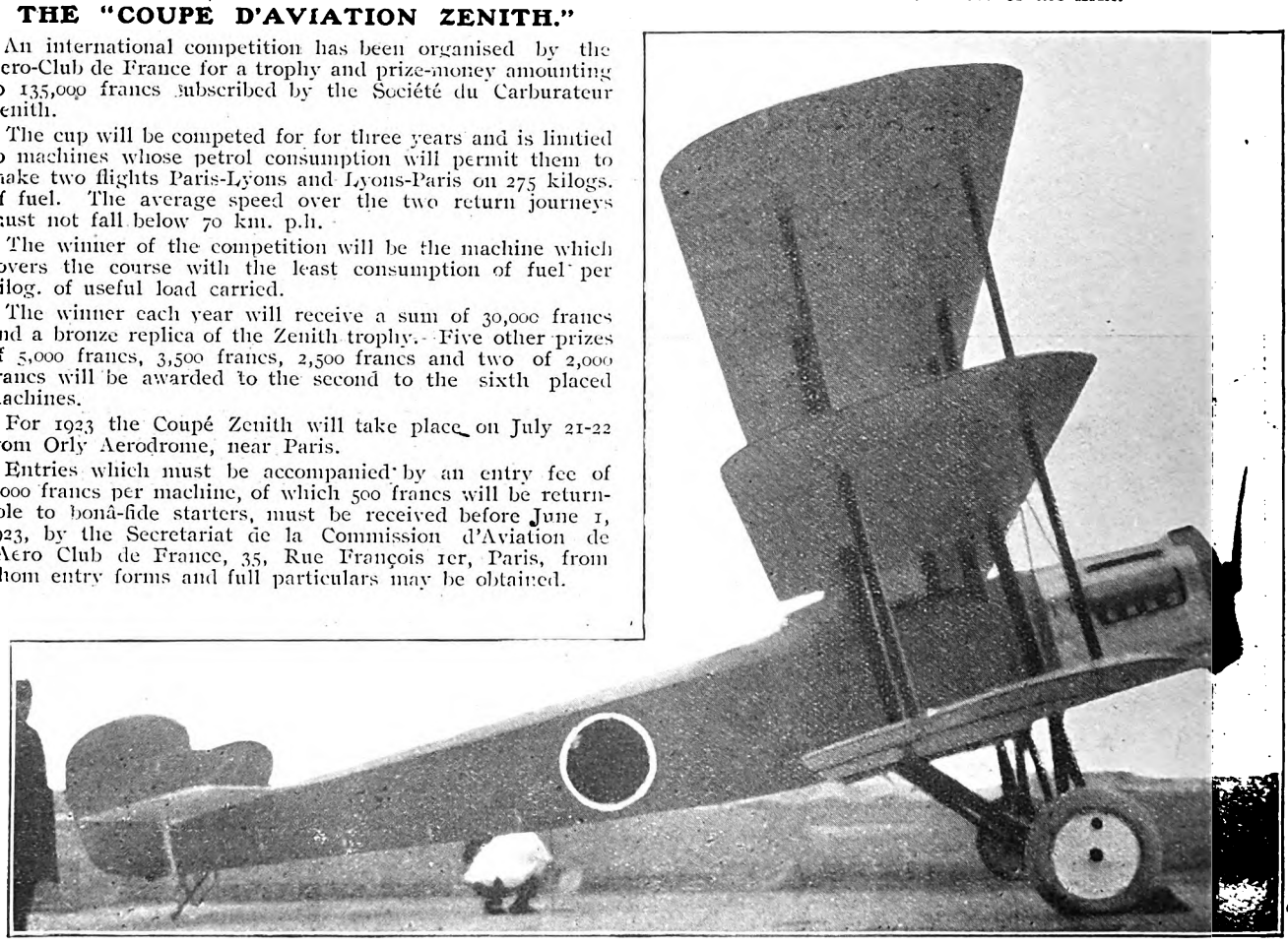
A satisfactory aileron which would not produce a turning moment would greatly help control under these conditions, and trials were now to be made with a Handley-Page slotted aileron to see if it would have the required effect.

None of this appears to be particularly new—and in fact controlled flight at above stalling angle was regularly practised by certain pilots at least 10 years ago

A TITANINE EXTENSION.

Titanine Ltd. have issued a statement that they have now purchased and taken over the goodwill, stocks, patents, trademarks, etc., of the British Emaillite Co. Ltd., now in liquidation.

Titanine Ltd. will in future supply "Emaillite" products when these are specified, but this will not in any way interfere with the manufacture and sale of Titanine—which continues to be the main business of the firm.



AN ANGLO-JAPANESE ADVENTURE.—An inelegant triplane built at the Mitsubishi Works to the designs of Mr. Smith, late of the Sopwith Co. Its power-plant is a Napier "Lion," otherwise it has a distinctly war-time appearance.

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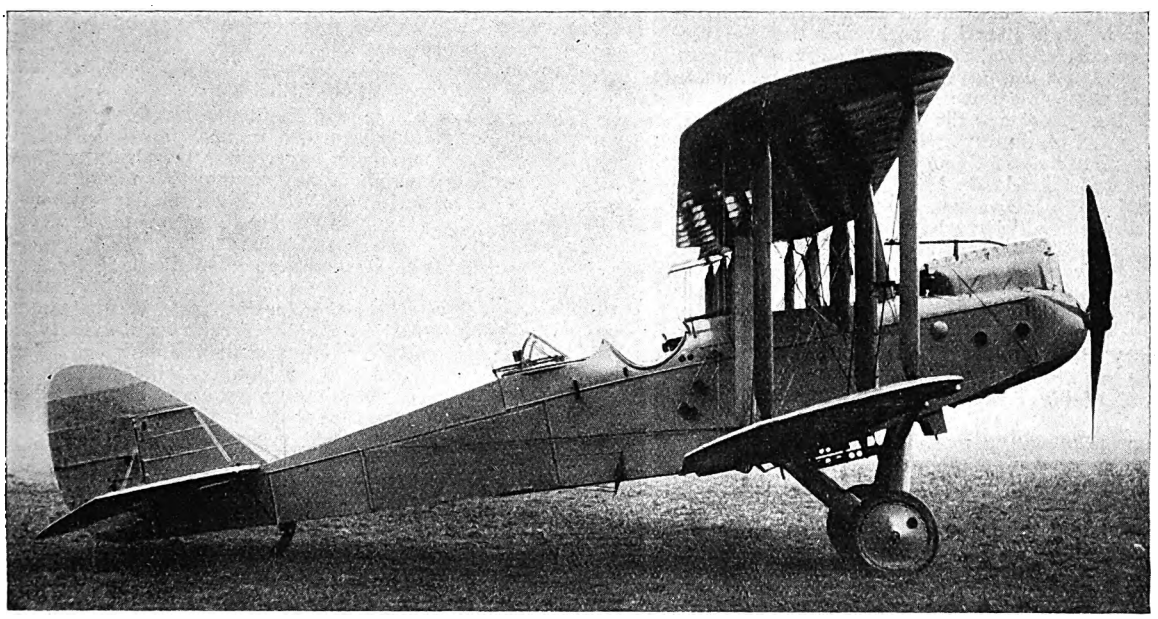
BRITISH ADC LIMITED AIRCRAFT.



D.H 9.—230 h.p. SIDDELEY "PUMA."

D H.9b. - ROLLS-ROYCE "EAGLE VIII."

The D.H.9 & D.H.9B (A.D.C. Modification) as shown above, are both examples of the thorough workmanship and extreme care which are characteristic of all reconditioning and modifications undertaken by the Aircraft Disposal Company, Ltd.

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(*Continued from page* 208.)

ten years. What he wanted to ask the Prime Minister was when we had this reply would it finish the whole matter? The House was getting sick of it and they wanted an assurance that after this inquiry they would have a little peace to get on with their jobs.

The grievance of our Naval friends seemed a little obscure. Our Naval work was the best in the World and we had better flyers than anybody else and a better type of machine, but he wanted to draw attention to the fact that the Washington Conference only allowed us to have four seaplane carriers and the Air Ministry had given the Navy more machines than they could put into service.

He felt that years ago the Navy did not realise the power and the future of aircraft and they now seemed to realise it too much. He quoted the *Morning Post* as saying "If the Fleet has to be gradually lifted out of the sea into the air those best suited to conduct this policy are those who have made a study of and have lived upon the sea." He pointed out that there is already a Navy of the Air, the Air Force, and that was what it ought to remain.

What we were afraid of was that this agitation to get control of the Air Force was the thin end of the wedge for they knew the immense power of the Admiralty, the biggest bureaucracy in the World. When they got their feet in they would do the same as when they were in partnership with the Royal Flying Corps. Surely if an organisation were found bad in the War and another one were found good when peace came that was no reason for changing it.

Captain Viscount Curzon, who might almost be described as the Member for the Admiralty, said that they would never have co-operation between the Services so long as they had people of Col. Brabazon's mentality putting forward such views. The Navy required an Air Service for purely naval purposes and nothing else. There was nothing more absurd than for advocates of the Air to come to the House and try to make out that this was a deep-rooted plot to uproot the Air Ministry and destroy the Service.

Many on the Naval side definitely recognised the Air Service as an essential part of our national scheme of defence. The Navy wanted an Air Service of its own with entire control and responsibility for it. It did not in any way wish to control air operations operating from the land over the sea.

The Navy wanted to organise the training of its Air Service as far as possible through the Air Ministry. It wanted to organise supplies through the Air Ministry and not to enter into competition with them.

Referring to the Air Estimates he drew attention to an item for "Advertisements in newspapers, £1,000"—which item is of course for advertising recruiting and so forth. Viscount Curzon chose to insinuate that recent articles in the *Daily Chronicle* headed "Hands off the Air Ministry," "New Campaign against Air Service," and so forth were paid for out of the said thousand pounds.

He said there was nothing he deplored more than that a great many people in this country thought that the Navy was antagonistic to the Air Service. It was not so at all. The Navy looked on the Air Service as absolutely vital to it. In fine Viscount Curzon's speech was an excellent exposition of the good old Naval outlook contained in the quotation "Orthodoxy is my doxy, heterodoxy is everybody else's doxy," and in the idea that "if the lion must lie down with the lamb the lamb must necessarily be inside."

That ended the debate for the time being. Apparently the discussion can be renewed in the form of questions when the rest of the Air Ministry Votes come up for consideration and then doubtless the Air Minister will make an official reply.—C. G. G.

THE R.A.F. MEMORIAL.

H.R.H. the Prince of Wales has kindly consented to unveil on July 16 the War Memorial, erected on Westminster Embankment by the R.A.F. Memorial Fund to the memory of the Officers and Airmen of the Flying Services of the Empire who fell in the War, 1914-18. H.R.H. the Duke of York, President of the R.A.F. Memorial Fund, has signified his intention of being present on this occasion.

THE MILLION-POUND LOOK.

It is quite time that an official statement was made with regard to the composition and financial position, if any, of the proposed £1,000,000 Civil Aviation company. It is persistently rumoured that the Managing Director will be none other than the present Director of Civil Aviation and that the financial arrangements are in the hands of Mr. Holt Thomas.

With regard to the latter rumour one has good grounds for stating that Mr. Holt Thomas has nothing to do with the financial arrangements, though one believes that the people in the City who were willing to back Mr. Holt Thomas when he put up a similar scheme early in 1921 are willing to back the present venture if they agree with the Government's terms.

With regard to Sir Sefton Brancker's position, if this very prevalent rumour has any truth in it, it should be made known exactly how Sir Sefton stands. If it is untrue it ought to be denied authoritatively and at once, for it is obvious that if he is to be a future competitor Sir Sefton's official position will become somewhat difficult and involved in relation to existing civil aviation firms. If on the other hand he is definitely to continue in his present position then the fact should be declared so that everyone concerned may know where he is.

MR. LARRY CARTER'S APPOINTMENT.

In the last issue of THE AEROPLANE one stated that Mr. Larry Carter the well-known Handley Page pilot was leaving that firm to join the Bristol Aeroplane Company. This should have read that he was leaving Handley Page Transport Ltd. to join the Gloucestershire Aircraft Company as chief pilot.

Mr. Carter was one of the earliest pilots on the London-Paris Service, having joined Aircraft Transport and Travel Ltd. when that concern first started in 1919. After that he did much good work in Spain for the Bristol Company and last year he joined Handley Page Transport Ltd. where he has gained an enviable reputation. He flew the Bristol monoplane in the Aerial Derby last year and by extremely fine piloting won the handicap by a few seconds.

There is little doubt that mounted on the Bamel and on the Bamel's successors he will do much to enhance the very fine reputations that both he and the Gloucestershire Aircraft Company have already attained. He takes up his appointment at the end of the present month.

Mr. "Jimmy" James who has hitherto been the company's pilot is leaving on the expiration of his contract. During his two years with the Gloucestershire Company he has done much excellent work and has not damaged so much as a wire during that whole period. He has won two Aerial Derbys in succession and has put up the British speed record officially and the World's speed record unofficially. He will carry the best wishes of all to whatever new post he may take.—G. D.

A LORDLY DISH.

A race for low-powered aeroplanes will take place on Saturday, June 23. It will start and finish at Lympne and will be over a 400-mile course with turning-points at Croydon, Bristol and Birmingham. The engine-power of machines must not exceed 150 h.p. and all machines and engines must be all British flown by British pilots.

Lord Edward Grosvenor, whose estate is near Lympne and who takes a large interest in the aerodrome there, will present a challenge cup to the winner. He will also give a prize of £100 in money to the winner and £50 to the second man.

Lord Edward Grosvenor is one of the earliest British pilots having owned a 50-h.p. Bleriot monoplane long before the war. This machine which is one of the world's most famous weight-lifting aircraft was bought by the Government on the outbreak of war. Lord Edward joined the R.N.A.S. and saw much active service as a pilot and subsequently went to Italy as an expert on bombs with which docile creatures he was always on most familiar terms. Incidentally he won the Croce da Guerra for some very gallant bombing work over the Australian lines, and not, as has been alleged, because he was lifted by a Caproni.

Later on he transferred to the R.F.C. and will be remembered by many in France in 1917 as Machine-Gun Officer to the XXII Wing where he added considerably to the gaiety of nations. His re-connection with aviation will be welcomed exceedingly.—G. D.

EFFICACY.

The following paragraph appeared in a Japanese newspaper recently:—

"ERUPTION IS OBSERVED:—The Navy Department sent an airplane to Oshima Tuesday to observe the eruption of Mt Mihara. The volcano is said to have subsided since."

The reader of THE AEROPLANE who sends the paragraph remarks:—"Another victory for the Imperial Japanese Navy. Would similar action quell the periodic eruptions at 175 Piccadilly?"

The Answer is in the Negative. No observations of any kind have any effect on 175.

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The "JAGUAR"
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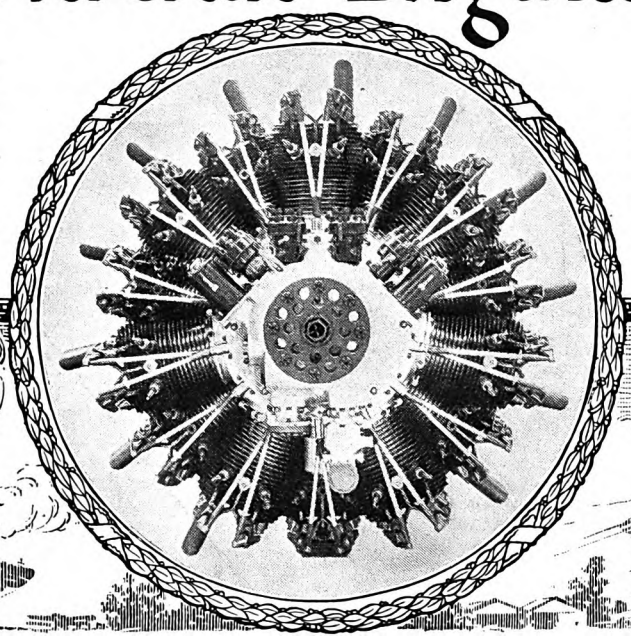
gives 350 h.p. at 1,600 revolutions. It is the most compact and complete unit for its horse power ever produced. Outside diameter is only 43 ins. Low petrol and oil consumption and perfect cooling.



Latest Models:
150 h.p. 7 cyl. Radial.
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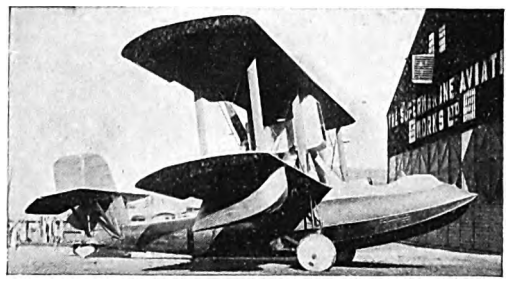
Duration of
1 hour 34 mins. 51⅘ secs.

Longest Distance
Accomplished 230 miles.

Fastest Time for
100 Kilometres } 28 mins. 41⅘ secs.
62 miles }

Fastest Time for
200 Kilometres } 57 mins. 37⅗ secs.
124 miles }



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R.A.F. INTELLIGENCE

Appointments.

AIR MINISTRY, Mar. 14.

GENERAL DUTIES BRANCH.—Grp/Capt. A. W. Bigsworth, C.M.G., D.S.O. A.F.C., from Armament and Gunnery School to command H.Q., R.A.F., Mediterranean, 2/3

F/Lts. C. J. W. Darwin, D.S.O., from R.A.F. Depot to Air Ministry (Dept. of C.A.S.) (D.O.I.), 26/3; T. Henderson, M.C., A.F.C., from R.A.F. Depot to Air Ministry (Dept. of C.A.S.) (C. of C.), 1/3; G. N. Humphreys, from Air Ministry (Dept. of C.A.S.) (C. of C.) to R.A.F. Depot (Supernumerary), 1/3; L. G. S. Payne, M.C., A.F.C., from Air Ministry (Dept. of C.A.S.) (D.O.I.) to R.A.F. Depot (Supernumerary), 26/3, and to No. 5 Wing H.Q. (I.A.), 4/4; N. Keeble, D.S.C., D.F.C., from R.A.F. Cadet College (Flying Wing) to H.Q., Iraq (Supernumerary), 23/2; W. G Preston, D.F.C., from No. 100 Squadron to R.A.F. Base, Leuchars (C.A.) (Supernumerary), 20/3.

Capt. D. E. Whitworth, M.C., 2nd Lancers (Indian Army), Col. Cdg. Troops (Palestine), on attachment to R.A.F., on appointment as Staff Captain, Palestine Brigade, 4/1.

MEDICAL BRANCH.—Grp/Capt. N. J. Roche, O.B.E., from H.Q., Iraq Command, to R.A.F. Depot (Supernumerary), 28/1.

S/Ldr. T. S. Rippon, O.B.E., from R.A.F. Depot to Central Medical Board, 9/3.

F/Lt. R. Boog-Watson, M.B., D.P.H., from H.Q., Iraq, to Station Commandant, Iraq, 5/11

ACCOUNTANT OFFICER.—S/Ldr. A. G. N. Belfield, from Electrical and Wireless School to School of T.T. (Men), 26/2.

AIR MINISTRY, Mar. 20.

GENERAL DUTIES BRANCH.—Grp/Capt. E. R C. Nanson, D.S.C., A.F.C., from R.A.F. Depot to Inspector of Recruiting (Supernumerary), for duty as Inspector of Recruiting, 15/3

Wing/Cmdrs. O. T. Boyd, O.B.E., M.C , A.F C., from No. 24 Squadron to command School of Army Co-operation, 26/2; H. R. Busteed, O.B.E., A.F.C., from R.A.F. Base, Gosport, to No. 1 Group H.Q., 16/4; R. J. Bone, C.B.E., D.S.O., from Inspector of Recruiting to command R.A.F. Base, Calshot (Supernumerary), 6/4; J. E. A. Baldwin, D.S.O., O.B.E., from R.A.F. Staff College to R.A.F. Depot (Supernumerary), 4/4; R. E. C Peirse, D.S.O., A.F.C , from R.A.F. Staff College to command R.A.F. Base, Gosport (Supernumerary), 4/4.

S/Ldrs. V. Gaskell-Blackburn, D.S.C., A.F.C., from R.A.F. Trans-Jordania H.Q. to Aircraft Depot, Middle East, 20/2; F. J. Rutland, D.S.C., A.M., from H.Q., Coastal Area, to Half-pay List, 3/3; B. E. Smythies, D.F.C., from R.A.F. Staff College to No. 41 Squadron, to command on completion of Staff course, 4/4; W. A. McClaughry, D.S.O., M.C., D.F.C., from R.A.F. Staff College to No. 5 Wing, 4/4; K. R. Park, M.C., D.F.C., from R.A.F. Staff College to R.A.F. Depot (Supernumerary), 4/4; H S. Powell, M.C , from R A.F. Staff College to No. 24 Squadron (Supernumerary), 4/4; E. B. Beauman, from R.A.F. Staff College to R.A.F. Base, Leuchars, for command of Reconnaissance Flights, 4/4.

F/Lts. W. S. Magrath, from No. 14 Squadron, Palestine Command, to R.A.F. Trans-Jordania H.Q., 1/3; C. H Hayward, from R.A.F. Staff College to No. 24 Squadron, 4/4; J. B. Cole-Hamilton, from R.A.F. Staff College to No. 1 F.T.S , 4/4; H. S. Kerby, D.S.C., A.F.C., from R.A.F Staff College to No 3 Group H.Q , 4/4; N W. Wadham, from R.A.F. Staff College to No. 3 Group H Q., 4/4; W. R. D. Acland, D.F.C., A.F.C., from R.A F. Staff College to H.Q., Coastal Area, 4/4; W. B. Farrington, D.S.O., from R.A.F. Staff College to No. 2 F.T.S., 4/4; E. B C. Betts, D.S.C., D.F.C., from R.A.F. Staff College to No. 1 F.T.S., 4/4; G. M. Lawson, M.C., from R.A.F. Staff College to No. 3 Group H.Q., 4/4;

MEDICAL BRANCH.—S/Ldr. H. A. Hewat, M.B., D.T.M., from Central Medical Board to H.Q., Iraq Command (Supernumerary), 23/2.

F/Lts. T. McClurkin, M.B., D.P.H., from Research Laboratory and M.O.S. of I. to Baghdad Combined Hospital, 23/2; D McLaren, M.B., from R.A.F. Hospital, Cranwell, to H.Q., Iraq Command, 23/2.

The King's Levee.

H.M. the King held a Levée at St. James's Palace on Mar. 13. H.R.H. Grp/Capt. the Duke of York was present attended by Wing/Cmdr. L. Greig. Among those in attendance upon His Majesty was Air Chief-Marshal Sir H. M. Trenchard, Principal Air Aide-de-Camp. Among those who attended the Levée were Air Vice-Marshals Sir W. G. Salmond and Oliver Swann.

The Secretary of State for Air presented the following officers of the R.A.F. to the King :—Alliott, F/O. E. H.; Briddon, F/Lt. A. J.; Britton, F/O. E. A., D.F.C.; Bushell, F/Lt. H. G.; Carter, F/O. B. R.; Coates, F/Lt. F. E.; Davy, F/O. R. M.; Jay, F/O. N. H.; Keith, F/Lt. C. H.; Mylne, F/Lt. A. W.; Nicholl, Wing/Cmdr. H. R., O.B.E.; O'Brien, F/O. F. A.; Pearce, F/O. F. L.; Pyne, F/O. G. E.; Stevens, F/O. A. C.; Whitelock, Wing/Cmdr. A. T.; Young, F/Lt. R. All on first appointment.

Peirse, Wing/Cmdr. R. E., D.S.O., A.F.C., on promotion by Admiral Sir R. Peirse, K.C.B., K.B.E., M.V.O.

Naval Co-operation.

From the *Times*, Mar. 19 :—

The Air Council has allotted two vacancies for naval officers at the Staff College, Andover, for the course beginning about May 1. The course lasts approximately one year, and selection will be made from lieutenant-commanders up to two years' seniority, and from lieutenants over six years' seniority at the opening of the course. Officers with flying experience will be given preference, and those who wish their names to be considered should forward an application to the Admiralty through the usual channels as soon as possible. The new arrangement with the Air Council is similar to one already in existence, by which lieutenant-commanders or lieutenants are appointed for study at the Staff College, Camberley; conversely there are vacancies placed at the disposal of military officers at the Naval Staff College, Greenwich.

From the *Times*, Mar. 20 :—

Concurrently with the announcement of the date for the next course for naval officers desiring to qualify as air observers, the Admiralty have approved of revised arrangements in regard to this training, which was started in Nov., 1921, since when three courses, each of seven months' duration, have been held.

For the two months' preliminary training at the naval schools one hundred marks will be allotted for gunnery and three hundred for signals; and for the five months' course at the Seaplane Training School at Lee-on-Solent six hundred marks will be allowed. Of the maximum of one thousand, officers who obtain eight hundred marks or more will be awarded a first-class certificate, those with 650-799 marks a second-class, and those below 650 will be failed.

New standards in each subject have also been adopted, and the particular attention paid to signalling is indicated by the adoption of 90 per cent. as the necessary standard in visual and in buzzer signalling : while in the Lee-on-Solent course 95 per cent. in buzzer (eighteen to twenty words per minute) has to be obtained. Officers who have already qualified as observers, except in buzzer, are required to undergo a further test in this subject, to be held at sea by a board appointed by the Commander-in-Chief, and confirmation will depend upon their obtaining the necessary 95 per cent. of marks in this test The next course for observers begins on May 28.

[It strikes one as being quite in accord with Naval ideas that in these days of long-range wireless telephones the Admiralty should set so much store by the buzzer.—Ed.]

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES

For week ending Mar. 18 :—

TRIPS PER DAY.—Monday, 14; Tuesday, 4; Wednesday, 14; Thursday, 6; Friday, 10; Saturday, 18; Sunday, 1.

LONDON—PARIS :

Handley Page Transport, Ltd., machines 9*, passengers 61; Air Union, machines 18†, passengers 76; Total machines 27, passengers, 137.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 12*, passengers 59.

MANCHESTER—LONDON—AMSTERDAM :

Daimler Airway, machines 17, passengers, Manchester-London, 16, London-Amsterdam, 10.

LONDON—ROTTERDAM :

K.L.M., machines 9, passengers 5.

Total number of trips by British machines : 40, carrying 126 pas. Foreign machines : 27, carrying 81 pas.

SPECIAL MACHINES, LONDON-MADRID :

Surrey Flying Services, machines 2, passengers 0.

STATITSICS.

Machines, 67; Passengers, 207; Crews, 126; Total Personnel, 333.

Corresponding week last year :—

Machines, 53, Passengers, 113; Crews, 88; Total Personnel, 201.

Corresponding week, 1921 :—

Machines, 35; Passengers, 92; Crews, 43; Total Personnel, 135.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

For the first time this year more than 200 passengers were carried by the air lines. The London-Paris route is already beginning to boom and both the Handley Page Transport machines and those of the Air Union are becoming more crowded. The ding-dong struggle for the largest number of passengers carried was won this week by the Air Union, who carried 76 passengers to H.P.T.'s 61. Things are looking up and soon both these firms will need extra machines.

On one day last week a brand-new Goliath on its maiden trip landed down the aerodrome over the lighthouse, overran itself and bit the " Put-and-Take " hut belonging to the A.D.C., which has been left high and dry on the aerodrome by the receding tide of Bessoneaux portable hangars. Both the Goliath and the said " Put-and-Take " hut were, as the French say, lightly deteriorated.

On Saturday morning Messrs. Muir and Youell left for Spain on two D.H.9s which had been ordered from the Surrey Flying Services by the Spanish Government. The services were secured of Lt.-Col. G. L. P. Henderson to fly the S.F.S. Avro for the ordinary Saturday and Sunday joy-riding. It is now some 27 months since Col. Henderson last flew but he had quite evidently lost none of his old skill.

The Surrey Flying Services have now taken over the big hut next to what was Basil Foster's garage for the erection and maintenance of their stock. The garage has been taken over by Thos. Tilling Ltd., who are now responsible for all the ground transport of the Aerodrome.—G. D.

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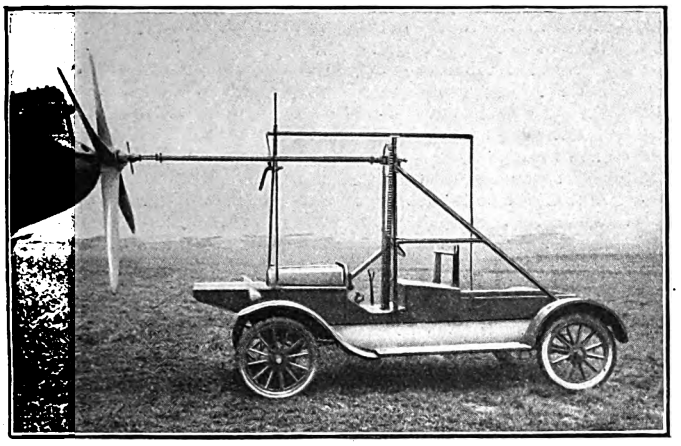

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THE REVIEW OF THE YEAR (*Compiled by M. H. & G. D.*)

[*The balance of "The Review of the Year," which follows, was put into type to appear in the second issue in January in accordance with custom. Unfortunately owing to the exuberant verbosity of other people and owing to limitations of space caused by shortage of advertisements due to lack of Government orders ascribable to absence of Parliamentary foresight there has been no room for it until this week, and even now it is occupying space which ought to be devoted to more interesting matters. Still it has been set so it must be used. And anyhow it would be untidy to publish a review of 9 months and leave the rest, so the long-suffering readers of* The Aeroplane *must have it.*—C. G. G.]

OCTOBER, 1922.

Service Aeronautics.—On October 1st the R.A.F. in Iraq was designated by the Air Ministry the "Iraq Command."

The appointment of Air Vice-Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., from H.Q., I.A. to command R.A.F. Iraq as from October 1st, was gazetted by the Air Ministry on October 19th.

The Aeroplane of October 25th commented on the changes at that time taking place in the Government and regretted the inevitable departure of Captain Guest the Secretary of State and of Lord Gorell Under-Secretary for Air.

Civil Aviation.—On October 26th the Royal Aero Club held an exceedingly cheery dinner at the Savoy to celebrate the success of the King's Cup Race and to congratulate the winner of the Schneider Trophy Mr. J. H. Biard who won the Trophy for England on a Supermarine Flying-boat with a Napier "Lion" engine. The Chair was taken by Lieut.-Col. J. T. C. Moore-Brabazon in the absence of the Duke of Atholl in Scotland.

The Second Meeting of the International Commission for Air Navigation was held from October 25th to 28th under the Presidency of Major-General Sir Sefton Brancker.

On Oct 2nd the Instone Air Line ran their last machine on the Paris-London route, Mr. Barnard bringing back a D.H.34. The Daimler Airway continued to run by special arrangement with Handley Page Transport for the next ten days carrying newspapers.

On Oct. 9th the Daimler Airway began their service to Holland.

The first Rolls-Royce "Eagle IX" was tested in the air in a Vickers "Vulcan" early in October.

On Oct. 16th the first British Gliding Contest was held under the auspices of the Royal Aero Club at Itford Hill. There were several prizes, the most important being £1,000 offered by the proprietors of the *Daily Mail* for the longest duration glide. There were between thirty and forty entries out of which rather more than a dozen materialised. The £1,000 prize was won by M. Maneyrol on a Peyret tandem monoplane who towards the end of the last day of the competition made a glide of 3 hours 21 mins. 7 secs. starting from Firle Beacon and landing in the dark. Mr. Raynham on a Handasyde monoplane was second with 1 hour 53 mins. and Squad. Ldr. Alec Gray was third on a glider made from a Bristol "Fighter" fuselage and a Fokker D.VII upper plane with a flight of 1 hour and a few secs. Mr. Gordon Olley, the well-known Handley Page pilot, made a flight of 49 mins. on a Fokker biplane with a passenger. The whole meeting was a great success.

On Oct. 30th the first regular inland air service was opened by the Daimler Airway between Croydon and Manchester.

Aeronautics Overseas.—The race for the Coupe Deutsch took place on Oct. 1st at Etampes and was won by Mr. Lasne on a Nieuport. The only British entrant, Mr. J. H. James, on the Gloucestershire Aircraft Company's "Bamel" with Napier engine was compelled to land before completing the course owing to location trouble.

In The Aeroplane of Oct. 4th was published an account of the work and policy of the Aerial Survey Company of Newfoundland.

The delivery during October of three Macchi 18 flying boats at Barcelona and two Savoia 16 bis flying boats at Los Alcazeros brought the number of Italian flying boats delivered to the Spanish Naval Air Service up to twenty.

On October 6th a new Duration Record of 35 hrs. 18 mins. was put up in the United States by Lieuts. John Macready and Oakley Kelly, of the U.S. Army Air Service.

On October 8th the Curtiss Marine Trophy Race took place at Detroit, the winner being Lieut. Gorton on a Curtiss T.R.I.

On October 14th the Pulitzer Trophy Race took place at Detroit, the winner being Lieut. Maughan of the U.S. Army Air Service on a Curtiss Army biplane.

On October 15th MM. Bossoutrot and Drouhin on a Goliath fitted with Leitner-Watts metal airscrews attempted to beat the Duration Record recently set up in the United States but failed owing to lack of petrol, their time being 34 hrs. 15 mins. 7.1-5 secs. Nevertheless it was homologated as a record by the F.A.I., there being apparently some purely technical flaw in the U.S. claim.

Dated October 16th a Reuter message stated that during the Government speed test for aeroplanes Lieut. Maughan on the Curtiss Army Biplane on which he won the Pulitzer Trophy race flew a measured kilometre at a speed of 248.5 miles an hour.

On October 18th Brig.-General W. Mitchell, C.M.G., Assistant Chief of the U.S. Air Service, established a new World's Record by covering four straights up and down a kilometre course at an average speed of 224.05 m.p.h.

At the Conference of the F.A.I. in Rome during October it was decided that after April 1st 1923 all speed records must be made over a straight line course of 3 kilometres instead of 1 kilometre as at present.

NOVEMBER, 1922.

Service Aeronautics.—The appointments of Lieut.-Col. Sir Samuel Hoare, Bart., to be Secretary of State for Air and of the Duke of Sutherland to be Under-Secretary were announced.

During November the awards in the 1922 Competition for the R. M. Groves Memorial Essay on "A Forecast of Aerial Development" were announced as follows: 1st Prize: S/Ldr. A. A. Walser, M.C., D.F.C.; 2nd Prize: S/Ldr. B. E. Smythies, D.F.C.; 3rd Prize: Wing-Comdr. J. T. Babington, D.S.O., who also won the Special Prize for the best imaginative résumé on "Aviation in the next World War."

On November 9th a Reuter message stated that as a result of Air Vice-Marshal Sir John Salmond's visit to India the Air Command in India had been raised to an air vice-marshal's command, Air Vice-Marshal P. W. Game being appointed to the post in place of Air Commodore T. I. Webb-Bowen.

The leader in The Aeroplane of November 29th dealt with the problem of the R.A.F. Stores Officer and a few possible remedies to the situation.

Civil Aviation.—It was recorded with great satisfaction at the beginning of November that the Sopwith Aircraft and Engineering Co. Ltd., who had been in liquidation for some time, were able to pay their creditors 20s in the £.

On Nov. 6th the Staff and personnel of Croydon aerodrome held their second annual dinner at the Greyhound Hotel, Croydon, with Sir Sefton Brancker in the chair.

During the foggy weather in November the value of wireless on aircraft was proved over and over again. Machines which would otherwise have lost their way on several occasions were directed into Croydon by wireless.

Aeronautics Overseas.—On November 3rd and 4th Lieuts. J. A. Macready and Oakley Kelly, U.S. Army Air Service, flew from San Diego, Cal., to Fort Benjamin Harrison, Ind., a distance of 2,000 miles on a Fokker F.IV. Their objective was New York but a cracked water-jacket forced them to land.

During November it was noted from a French paper that Lieut. Aviator Willy Coppens, D.S.O., M.C., Air Attaché at the Belgian Embassy, London, had been promoted from Chevalier to Officier in the Legion d'Honneur by the French Government.

It was made known during November that the Zeppelin Works at Friedrichshafen were very busy building a Zeppelin to take the place of the R.38, and that many U.S. official people were living at Friedrichshafen to study the building of the ship.

News was received of the death during November of General Von Höppner, who commanded the German Air Service from November 1916 to the end of the War.

The Second Half-Yearly Report on the operations of their flying boats on the commercial transportation of passengers and merchandise was published by the Aeromarine Airways of New York during November. The report showed that their machines had flown an aggregate distance of over 150,000 miles and carried 10,700 passengers without mishap.

In The Aeroplane of November 15th it was noted that the Australian Commonwealth Government on June 16th took delivery of the first of a batch of six Avro 504k biplanes built to their order by the Australian Aircraft and Engineering Co. Ltd.

An article on the British Aviation Mission in Japan under the command of Col. the Master of Sempill appeared in The Aeroplane of November 29th.

DECEMBER, 1922.

Service Aeronautics.—In The Aeroplane of December 6th it was noted that Lieut.-Col. the Rt. Hon. Sir Samuel Hoare, Bt., C.M.G., M.P., Secretary of State for Air, had appointed Major Viscount Sandon, M.P., as his Parliamentary Private Secretary.

In The Aeroplane of December 6th it was noted that H.M. the King had approved the appointment of H.R.H. the

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Prince of Wales to be a Group Captain in the Royal Air Force.

In the Court of Appeal on December 12th Mr. Justice Lush gave judgment in favour of Lieut.-Col. Law Markham against Holt and Co. in their claim for the return of overpaid gratuity.

A visit to the R.A.F. Staff College at Andover produced a leader in THE AEROPLANE of December 13th giving an impression of the Staff, their methods and organisation, and the students and their work, and the reasons for the existence of such a very important establishment as the Staff College.

On December 14th in the House of Commons in reply to a number of questions put by Lieut.-Comdr. Kenworthy Sir Samuel Hoare gave figures regarding the relative strength of the Air Force stationed in Europe of Great Britain, the French Republic and the Kingdom of Belgium, of the relative number of fighting, spotting and bombing machines respectively of modern construction and fitted for service maintained in Europe by these three Powers, of the number of trained pilots, observers and mechanics maintained by these three Powers on the active list.

On Dec. 15th the 1,000 h.p. Napier "Cub" made its first flight in the air in an Avro "Aldershot" machine flown by Mr. Bert Hinkler. It proved itself to be successful in every way.

CIVIL AVIATION.—On December 7th in the House of Commons Sir Samuel Hoare stated that the greatest mileage accomplished up to the end of November by a British commercial aeroplane in regular cross-Channel service was 100,393 miles without overhaul and that the machine was still in perfect condition only the engines having been constantly changed during the achievement of this mileage.

In the House of Commons on December 5th Mr. Murchison asked the Secretary of State for Air whether he was aware that the sale of British newspapers in France and Italy had increased fivefold during recent months owing entirely to their early arrival by aeroplane and whether the new subsidy given as a monopoly to Handley Page Transport Ltd. for the London-Paris route provided for the daily delivery of British newspapers as well as passengers and whether the transport of passengers was not remunerative without subsidy. In reply it was stated that although the advantages of carrying British newspapers to the Continent by air were fully realised it was not possible to say whether a subsidy could be afforded to help this work, and that it was open to Handley Page Transport to use their subsidy in the manner which they found most remunerative as the present small number of passengers did not enable the Air Line to pay its way on their fares.

Rear Admiral Sueter asked whether the Secretary of State for Air was aware that money grants to French civil aviation companies enabled them to carry British newspapers and freight between London and Paris on French machines at rates with which it was hopeless for British companies to compete and whether some arrangement could not be made to prevent this state of affairs and was informed that this fact was known and that the future policy of Civil Aviation was under consideration and that the foregoing facts would be borne in mind when the question of subsidies for air transport lines arose.

In reply to a question by Viscount Curzon on December 13th the Secretary of State for Air said that the German Government had accorded British aircraft the right to fly into occupied territory provided German aircraft of equal flying capacity were allowed to do likewise, and that His Majesty's Government was considering this condition.

On Dec. 13th it was announced that Selfridge and Co. Ltd. had offered a prize of 1,000 guineas for the first glide of 50 miles in a straight line and the conditions for this were announced by the Royal Aero Club.

On Dec. 6th the new Handasyde "H.2" monoplane with a 360 h.p. "Eagle VIII" Rolls-Royce was tested successfully at Brooklands by Mr. Frank Courtney.

AERONAUTICS OVERSEAS.—A paragraph on aviation in China from news imparted by an Englishman shortly returned from that country appeared in THE AEROPLANE of December 6th wherein the hopeless lack of organisation and progress of aviation in China was attributed to inertia on the part of the Chinese Government in helping the development of commercial aviation.

At the Annual Congress of the Fédération Aéronautique Internationale which was held about this time although it was not conceded that Germany should be readmitted to the Congress it was decided that each national aero club should have the power to admit or exclude German pilots from competition organised by the various clubs.

The Paris Aero Show, which opened on December 15th, was dealt with fully in issues of THE AEROPLANE dated December 20th and 27th. The exhibits were illustrated and described with specifications, arranged alphabetically under the name of the firm, and in a brief comment on the show itself it is hoped that when the Society of British Aircraft Constructors can afford to hold a British Aero Show it will organise and run it as excellently as the French Aircraft Industry manage their show.

At the time of the Paris Aero Show THE AEROPLANE published a Special Foreign Issue giving a review of the British Aircraft Industry of 1922 in English, French and Spanish. This issue was sent to all English and foreign people abroad connected with or interested in aviation.

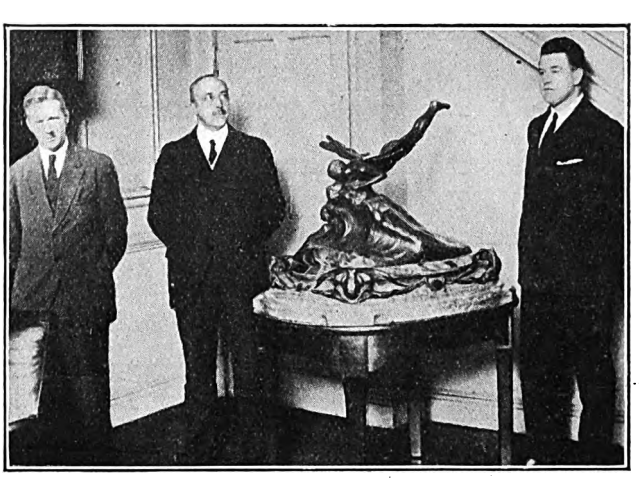
On December 15th the first German aeroplane to leave Germany for England since August 1914 with perfectly good intentions left Berlin for Croydon, the machine being an Albatros belonging to the Deutsche Luft Reederei. The pilot who had acquainted himself with the route during his numerous raids on London during the War received a hearty welcome among aviation people in England especially among fighting pilots.

The *Daily Telegraph* of December 5th reported operations by a Free State aeroplane on Irregulars in Cork with complete success.

On December 31st M. Sadi Lecointe on a Nieuport Delage "Sesquiplan" covered a kilometre course four times at an average of 348.02 kilometres per hour, thus beating his previous record of 341.239 kms.p.h. and that of Mr. James on the "Bamel" of 341.423 kms.p.h.

A SEAPLANE MEETING.

One understands that in addition to the Schneider Cup race on Sept. 28 at Cowes there will also be other seaplane events. Entrants for the big event have expressed their willingness to participate in other events after the Schneider Race but not before it. Hence the main race on the Friday which in the event of a fog gives busy people the chance of staying during Saturday and Sunday to see the races.



THE SCHNEIDER TROPHY.—Here the trophy is seen back in the hall of the Royal Aero Club. On the left is Mr. H. C. Biard the winning pilot. In the middle is Mr. H. T. Vane of Napiers. And on the right is Mr. Scott-Paine of the Supermarine Co. (not, as has been suggested owing to his pugnacious attitude in the photograph, the new "White Hope" Battling Painski).

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ON THE NEWSPAPER ATTACKS ON THE R.A.F.

[The following letter in reply to the attacks on the R.A.F. in the *Daily Mail* has been sent to the Editor of that paper who has replied that he would prefer to have the official defence from official quarters under due official responsibility. One is surpised that the editor of the *Daily Mail* is unaware that officers and gentlemen on the Active List do not indulge in newspaper controversies and that the Air Ministry states its case in the Houses of Parliament and not in the daily press. Also it seems strange that if he wants the truth he does not apply for it at the Press Section at the Air Ministry instead of allowing his subordinates to disfigure his columns with flagrant calumnies on our First Line of Defence.—C. G. G.]

175, Piccadilly, W.1, Mar. 23, 1923.

Sir,—As there are two sides to every argument may I have the privilege of presenting to your readers another side of the criticisms of the Air Force published in to-day's *Daily Mail*?

At the end of the War the R.A.F. consisted of 30,000 officers and 300,000 men. To-day it consists of 3,000 officers and 30,000 men. In the event of the outbreak of another war it would have to be expanded in the quickest possible time to at least its wartime strength and thereafter would have to be still further increased. Consequently it is necessary for the Air Force to have a ground organisation capable of handling 30,000 officers and 300,000 men though at the moment we may only have some few hundreds of officers who are actually pilots.

Apart from the trained war pilots who have left the Air Force we should in the event of war have to train and organise many thousands of new pilots. Therefore it is necessary that the Air Force should be "organised for every conceivable purpose except flying."

The statement that there is "a tendency not to push flying" is untrue so far as the Air Staff is concerned. The reason why there is less flying done than there might be is simply that hitherto Parliament has not voted enough money for new aeroplanes and new engines and it has not even been possible to buy enough petrol to fly the old wartime machines which still exist. If R.A.F. officers were allowed to consume Government petrol and to wear out Government machines in flying all over the country at their own sweet will for practice would there not immediately be an outcry from certain sections about the extravagance of the R.A.F.? Yet it is precisely such flying which would do most to keep the flying personnel of the R.A.F. in practice.

As to the 27,499 "airmen," "a large proportion of whom have never risen a foot in the air," may I point out that the word "airman" is the official term for the non-commissioned ranks of the Royal Air Force just as the word "seaman" is the corresponding word in the Navy. The airman is an aeroplane mechanic and is no more supposed to fly than an "able seaman" is supposed to navigate a warship.

On paper it is true that we employ nearly three men in the R.A.F. to every one employed by the French. That is because a large proportion of the French Service d'Aviation Militaire are borne on the books of the French Army and do not appear under aviation costs at all. Judged by the establishment of other nations or by Civil Aviation experience the R.A.F. appears to have an immense number of men on the ground to keep each aeroplane in the air, but let me point out how this happens. In Civil Aviation if an air line has say six aeroplanes it will probably have one machine at its terminal aerodrome, one machine at the other end of the route and one or perhaps two in the air at any given time and two or three in reserve doing nothing. As each machine returns to its terminal aerodrome it is inspected and overhauled and minor adjustments will be made to aeroplane and engine by the full staff of the firm's mechanics. Thus each machine is handled in rotation as may be necessary.

But consider the case of an aeroplane on active service. In a squadron at war strength you have 18 machines all of which must be fit to go into the air at once. Those machines go out on patrol and barring casualties all land at once with the prospect of going out again a few hours later.

A squadron must therefore have *for each machine* a couple of riggers, a couple of engine hands, a couple of men to handle guns and ammunition, a couple of men to look after bomb gear and to reload with fresh bombs, another one or two to look after its photographic equipment, another to look after its wireless equipment, and a couple more to refill with petrol, oil and water. Also there must be special technical N.C.Os. to see that the men do their work properly and owing to the number of different jobs it will probably run to another couple of men per machine though each N.C.O. would be looking after similar work on six machines. Then you have officers' servants to see that when the pilots and observers come in from patrol, they are properly provided with the necessary refreshments, clothes and so forth.

Thus at quite a moderate estimate it is absolutely necessary in any squadron organised for active service to have at least 20 men *per aeroplane* in order to ensure that the whole squadron may take the air at once. Apart from these the squadrons must still have its regular workshop hands for the heavier repair work which is not done actually on the aeroplanes and it must have its medical service with nurses, orderlies, ambulances and so forth and it must have its cooks, batmen and so on for the feeding of officers and men.

In the R.A.F. all this personnel is shown as R.A.F. Personnel. A squadron leader corresponds to a major in the Army and the total personnel under him works out very closely to that under a major commanding two double companies in the Army, namely 500 men.

The War and the work of the R.A.F. since the War has shown that our system of organisation produces much higher efficiency than that of any other country.

As to the £648,000 spent on the Air Ministry it must be remembered that this maintains an enormous technical staff which is constantly wrestling with the problems of producing new and better aeroplanes. Although the Navy is a highly technical Service it is not constantly dealing with such entirely new problems as is the Air Force and therefore necessarily the Air Ministry staff must cost more in proportion than either of the other Services apart from the fact that the non-technical staff has to be on such a scale as to deal immediately on the declaration of war with much greater numbers of men than the Admiralty will ever have to handle.

One of the chief reasons for all our Army troubles in the early days of the War was that the Staff of the War Office was organised on a scale to handle an Expeditionary Force of 140,000 men and was called upon not merely to handle millions of men in the first year of the War but to teach untrained officers, many of them direct entries from civil life, how to do Army staff work, which is a subject as highly technical as is engineering or navigation. If the War Office had had five times as many trained staff officers at the outbreak of the War it would probably have cost about half as much as it did in lives and money.

Is it fair therefore to attack the Air Ministry for laying down a ground organisation which will be capable of handling a huge war-time Air Force instead of our tiny peace-time Force? Surely preparedness should be applauded.

Signed C. G. GREY (Editor of THE AEROPLANE).

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ON THE LORDS AND THE COMMONS AND THE AIR.

It is almost an axiom that one hears more common sense talked in the House of Lords in an hour than one does in the House of Commons in a week the reason being that the House of Lords is chiefly composed of men born and bred to govern or else promoted to the House of Lords because of outstanding ability whereas the majority of the members of the House of Commons are elected thereto because of their glibness of tongue and not because of their mental capacity. The two qualities seldom go together. Therefore it is not surprising that the short debate in the House of Lords on Mar. 21 on the relative air strengths of France and Great Britain should have been of considerable interest.

The Earl of Birkenhead, better known as F. E. Smith, who rose to call attention to the subject may not have been born of the ancient British aristocracy but he certainly has a remarkable brain and is generally worth hearing. He began by pointing out that there were no implications against this Government because they could retort very effectively against the last Government, still less were they directed against the Duke of Sutherland of whom it was said that he has devoted himself to his new duties with the most praiseworthy assiduity. He pointed out that as for himself he had sat upon the Cabinet sub-Committee which mitigated the edge of the Geddes axe in its application to the Navy, the Army and the Air Force.

He said that we happened to find ourselves almost alone of all the belligerent nations in the position of a nation that was taxing itself to discharge the burdens of the war inasmuch as we conceived that we should probably have to pay the money which we had borrowed and we admitted that we owed. During the four years since the Armistice the gravest international problems have presented themselves and our foreign relations had not improved. At no moment since the Boer War was the tone of the French Press less friendly to this country than it was to-day. The British Army in Cologne was almost in a situation of blockade. The whole trade of British merchants with Germany was interrupted and subjected to harassment and annoyance. The change in the international atmosphere made it important to consider the security of these islands in the terms of the new diplomacy.

According to the Secretary of State for Air Great Britain had 371 service machines and France had 1,260. In 1925 Great Britain would have 575 and France 2,180 and the majority of ours were abroad. These figures disclosed a most alarming state of affairs. It had never occurred to him that a nation (France) which owed such immense sums of money could find it possible to construct these enormous armaments at a moment when there was not the slightest encouragement to suppose that one penny of that money could be paid either at present or in the near future.

Many people were apt to forget that our defence which was discharged in the past by the Navy must be discharged in the future by the Air Force and we should be lacking in our duty to the people unless we were able to afford them the guarantee of an Air Force which could defend them from attack. No one took offence because the French were building their immense armaments. It was possible in the past without impairing diplomatic friendships to discuss the adequacy of our Navy. International life would be impossible and intolerable if it were not reasonable without offence on one side or another for nations to discuss the terms of their national security.

Further Lord Birkenhead said that the reports concerning great German air preparations were most grossly exaggerated and that there is no German air menace at all at the moment nor could there be in the near future. If that were true the situation became even more alarming. This country could no more be content in the next three or four or five years with a position of inferiority in the air than it could be content with naval inferiority in the years before the outbreak of war in 1914. He did not believe it possible for any Government in this country to accept any standard than that this country in the air shall be at least equal to any foreign power.

A Little Light on the Situation.

This so far as one can recollect is Lord Birkenhead's first venture into aerial politics. It is curious that he should become suddenly so keen on a subject in which hitherto he has apparently taken little or no interest. The only Cabinet Minister of the first class who has previously concerned himself with air affairs has been Mr. Winston Churchill one of Lord Birkenhead's most intimate friends and one cannot help feeling that while the hand (or rather the tongue) is that of Birkenhead the voice is the voice of Churchill whose absence from politics is so much to be deplored.

One would not be so vain as to suggest that either Lord Birkenhead or Mr. Winston Churchill pay one the compliment of reading The Aeroplane regularly and one can only assume that the strange similarity between the views expressed by Lord Birkenhead and those which have been expressed by The Aeroplane for the past few months or few years is due to the fact that the views which have been held among the inner circle of aviation for so long are at last penetrating by a species of osmosis to the great outer world.

It is true that at present we need have no fear of the French Air Force but it is always well to be prepared for eventualities and it is common talk in what one might call aero-political circles in France that in the event of anything like an actual disagreement between the French and the English Governments the French Government would concentrate its immense Air Force on the northern aerodromes within easy flying distance of England with the intention of making an "aerial demonstration" similar to the naval demonstrations which in the past have been made so effectively by the English fleet without any hostile act but with the intent and the effect of impressing on the nation concerned that it would be a bad thing for it if it became offensive.

Those who have during the past few years noticed when travelling between Paris and Boulogne or Calais the immense railway works which are in progress at Longueau just outside Amiens must have realised that the whole arrangement of these works indicates that they are in fact intended to be an immense detrainment base for troops and war material. There is nothing within 50 miles of Amiens, situated as it is in a purely agricultural district, to make such works necessary for industrial purposes. And obviously nothing could be more conveniently placed for the rapid concentration, detraining and distribution through the Northern French aerodromes of air personnel and material than precisely such a centre in precisely such a position.

The only consolation is that it is just as easy to reach from England this detrainment centre and the aerodromes which it would serve as it would be for aeroplanes from these aerodromes to reach England. In fact despite the difference in numbers one is under the impression that it would be easier for British aeroplanes to reach them than it would be for French aeroplanes to reach England. And our new bomb-sights have an extraordinarily small margin of error.

Obviously if the French were ever so foolish as to organise such an aerial demonstration it would be a very serious matter. When England was Mistress of the Seas and there was none of this nonsense about a League of Nations and so forth it was quite a natural thing to send a detachment of the British Navy to go and make faces at any nation on earth which had the nerve to differ from us politically. Our gestures were always polite if a trifle menacing and everybody knew that it was no good arguing with us. But a similar attempt by France to overawe us by an aerial demonstration opposite our coasts would be quite another matter and would probably result in it becoming unfortunately necessary for us to consider once and for all which of the two countries was going to be top dog in the air. It would not take very long to settle the question but the settlement would probably cost considerably more than it would cost us to start to work here and now and build up such an Air Force as would make any such demonstation on the part of France merely as amusing as would be a French naval demonstration.

A Supplementary Statement.

Lord Birkenhead not content with his speech in the House of Lords continued his campaign for a big Air Force the following day by granting an interview to the *Evening Standard* in which his opinions were published on Mar. 22. Almost his first statement was that the time had come when an Air League should be formed to educate public opinion. This it will be recognised is precisely what The Aeroplane has advocated at intervals for the last ten years, the last occasion being a few weeks ago.

Lord Birkenhead is credited with having made the alarmist statement that France could to-morrow if she wished destroy without warning London and almost every great centre of industrial population. One hardly imagines that this was an accurate transcription of his remark. France might certainly attack London but if all the existing air fleets of the World with all the existing bombs were concentrated on London it would still be impossible to destroy it. What would actually happen would be that the alien population would panic and bolt for the tall timber or the lowest tubes and that the English population would remain behind and become so damned angry that nothing would ever satisfy them except the complete wiping out of Paris within the next twelve months.

One did however like Lord Birkenhead's statement that "many people are becoming very weary of the parrot-like protestations of devotion to France which come so easily to

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the lips of Lord Salisbury and his friends." He pointed out that a large number of influential French Generals dislike and distrust England, that France is engaged in a policy both political and economic of which this country disapproves and that many of the most influential writers in France are indulging in sneers and menaces at the expense of this country. He emphasised the fact that France is building her big Air Force when she utterly refuses to pay a penny of either capital or interest of her debt to us.

He said that he did not believe that the British Empire as a whole would agree that we should pay all our debts and receive nothing from our debtors. He reiterated the statement so often made in THE AEROPLANE that the talk of German aircraft menace is simply moonshine and asked against whom these French preparations are being made, as to which he said: "The answer is probably true that they are made not so much as an actual menace as to strengthen the tongue of diplomacy," and added "But through the centuries it has not been the practice of Great Britain to allow the tongue of any foreign diplomacy to gain strength in this fashion in matters which affect the security and even the existence of the Empire." Which it will be noticed is very much what one has already said oneself with considerably more detail in this paper.

The Official Reply.

The Under-Secretary of State for Air, the Duke of Sutherland, in a brief reply confirmed the figures given by Lord Birkenhead, but pointed out that the number of British squadrons at home was normally fourteen, composed of five purely home defence squadrons, five co-operation squadrons attached to the Navy and Army and four squadrons which ought to be at home but for the fact that they were at present at the Dardanelles. By 1925 the figure for all British machines ought to be at least 575. He said that the absence of so many squadrons abroad was accounted for by the geographical position of the British Empire and explained that the transport costs in respect of the twenty squadrons abroad were much heavier than the transport costs of the French Service whose overseas squadrons were chiefly in Northern Africa. Also he emphasised the fact that it was necessary to keep at home a working margin of personnel, 1,500 in all, especially for reliefs for the squadrons overseas.

He made an interesting point in his statement that the French Air Force is necessarily cheaper to run as the personnel consists of conscripts so that there is a great saving in pay, allowances, rations, clothing and works. Also the French in this way are able to draw upon the pick of the young mechanics in engineering shops and factories whereas we have to train raw personnel from the beginning after recruitment.

The Duke then made an important announcement which should be laid deeply to heart by those who still imagine that the Air Ministry is not sympathetic to the Aircraft Industry. He said: "From the point of view of national security another important factor, to my mind, is the keeping alive and encouragement of the Aircraft Industry in this country, so that in the event of war an immediate expansion could be made in the number of machines required for military service.

"This can be made possible only by encouraging civil aviation, by the standardisation of types of machines and by large orders for military machines in the immediate future. The encouragement of civil aviation will also help from a military point of view to the extent that the pilots who take part in this work will be asked to join the new reserve that is being formed for military pilots, and that their constant practice in flying will keep them to a certain extent in training, although some additional training would undoubtedly be required to make them competent military pilots. Opinions differ on the point of whether civil aviation machines could, in time of war, be adapted for bombing and other military purposes. This could undoubtedly be done to a limited extent."

He then referred to the cheapness of policing Palestine Iraq and the Middle East by air instead of by ground troops and he emphasised the fact that the larger the Air Force grows the less will be the cost per squadron and machine. In conclusion he said "If we wish to raise the Royal Air Force to a one-Power standard, on the basis of the present French strength we shall have to face immediately an expenditure of £23,000,000 per annum; whilst, if and when the full French programme of expansion is carried into effect, this figure will have to be increased to £35,000,000 per annum."

Finally he welcomed the debate and Lord Birkenhead's interesting speech and assured noble Lords that the Air Ministry would take a careful note of any helpful suggestion or criticism that they might have to offer.

The Duke of Sutherland is undoubtedly making an extremely good impression as Under-Secretary of State for Air. To be quite candid, his appointment was received with certain misgivings. Up to that moment he had taken practically no part in affairs of State and had been rather more prominently in the Public eye through being "featured" in the picture papers than as a constructive statesman. Everybody concerned with aviation is therefore the more gratified to find that he is not only taking his present work with due seriousness but that he is devoting a great deal of time and energy to it with considerable success. He is certainly winning the highest opinions of the older and more experienced men who have to work with and under him.

Some Basic Truths.

The Viscount Haldane confessed that he was left somewhat uneasy as to the home defence position. He stated definitely that "you will never see far ahead with foreign relations." He recalled that during the last quarter of a century at times we had been on terms of great friendship with the Central Powers and at others on terms of great antagonism with them. We had gone from one side to the other because we could not help ourselves. It was not we, but the changing situation that brought it about.

[Which strikes one as analogous to a bright jest in the current issue of *London Opinion* wherein a charming damsel says to her friend "Two months ago I was desparately in love with Ronald and now I cannot stand him. How men change!"]

Before the War we had ceased to have the advantages of splendid isolation. He had always thought that the real justification for the Entente Cordiale was that British naval supremacy had ceased to be possible while we stood by ourselves. Continental Fleets were growing and a combination might easily have come about in which we should have been outmatched. Therefore it was necessary that we should have some friends who at all events would be neutral.

There you have in a nutshell the basic principle of all diplomatic operations. It explains the shifting of the balance of power, the breaking of treaties, the hostility of former friends, and everything else. Lord Haldane is one of the few great statesmen left in this country and his words should be stated carefully. Although Lord Haldane was not a friend of aviation in the days when he was at the War Office it must not be forgotten that it was his Territorial scheme which made it possible to throw into the War during the first few months thousands of very fairly trained troops in spite of the starving of the British Army by politicians before the War.

Discussing future wars Lord Haldane pointed out that the economic question would be our first question, the Navy our second because it was still a strong power, and thirdly the Army, which as Germany was no longer in the field did not require a big Expeditionary Force. As to the Air Force he was in doubt. It could only take the place of the Navy to a small extent and to a considerable extent it took the place that cavalry used to hold with troops but he pointed out that none of these arguments touched the question of home defence. That problem was a special one to which the Committee of Imperial Defence should give its close attention. The point was, what chances have we of defending ourselves against a short range expedition from the Continent, the purpose of which would be to attack, say, London? He did not believe that France dreamt of war but the whole course of history was a record of constant changes and sudden situations emerging and you could not afford to leave out of account what the possibilities of those situations might be. Just as we had always felt it necessary in times of perfect peace to keep up a strong Navy so he thought we required a defence force for that particular emergency of which he had spoken.

He then delivered a delightful lesson on political economy, saying:—"In international affairs the level of morality has always seemed to me to be below the level of the morality of individuals. There is not a very gentlemanlike spirit between the Chancelleries as a rule, and you cannot rely upon people not taking advantage of you, even when your intentions have been of the best and the purest. The result is that if you make sudden and rapid reductions, without seeing that your neighbours are prepared to make their reductions on the same footing and at the same time, you are not making for peace. It is a paradox that it should be so, but reductions of your necessary defences may be the way of leading to the greatest extravagance, in bringing about situations where you have suddenly to recover yourself, and to resort to extravagant expenditure to do so."

That little passage ought to become historical. In it lies the whole philosophy of self-defence. It is the absolute reply to all the foolish pacificism of the Labour party. It is not the same as the old Horatian tag "*Si pacem vis para bellum.*" It is the answer to the question "As you must prepare for war what is the cheapest way of doing it?"

Referring to Germany he said "No country can raise a considerable army, or a considerable Navy, or a considerable Air Force even, unless it has its Government behind it. The German Government is not in a position to raise any arma-

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ments, and the result is that no large amount of armaments can possibly be raised."

He then said that war with the United States was inconceivable if only because of the distance, and continued: "But some Continental Power, if you did quarrel with it, would have the capacity to do you a great deal of damage in one respect, and one respect only—namely, that kind of sudden attack; as a bombing attack it may be a mission of destruction undertaken with the design (I think a mistaken design, and one which would fail) of bringing terror to the people of this country. The people of this country are not easily terrified; they will endure. But we do not want them to have to endure and we do not want to have a situation where we may, all of a sudden, have to create a Defence Air Force of this kind under circumstances which may look as if we thought war was actually on us."

He suggested that the right way to go to work was to work out plans very diligently and very carefully, with the best military talent we could bring to bear on the problem, and then to build up reserves.

He said: "Before the War we were short of aircraft. They had not been thought of so early as they were thought of in France and Germany. I was faced with the difficulty of providing them, and I remember well what happened. The manufacturers came crowding forward and said: 'Let us build; it is only a question of money and we will produce plenty of aircraft.' I saw admirable people, of great energy and great enterprise, the brothers Wright and others; but a little conversation with them satisfied me that, able as they were, they were mere empirics. And we found it better—it was done by the Government to which I belonged—to establish a branch of the National Physical Laboratory at Teddington, at which the late Lord Rayleigh presided over the best experts we could get in the country to work out the plans. We set up a construction factory at Farnborough close by, where these plans were translated into actual models to be issued to the manufacturers for them to build from. The manufacturers did not like it, and there was great criticism of the Government for its apathy. But we were not apathetic at all, and we got the benefit of our arrangements afterwards.

"I am sure this is the right plan, and that it is the plan to follow now. Do not rush into giving an enormous lot of orders for what you call standardised air machines. They are standardised to-day; to-morrow they are obsolete."

Past and Present Policy.

One does not quite follow the line of Lord Haldane's argument in this last passage. He is quite correct in objecting to giving out an enormous lot of orders for standardised machines. But surely it was his own policy via the N.P.L. and the Royal Aircraft Factory which resulted in our having for the first two years of the War an enormous number of standardised machines which were already obsolete by the time they were built.

That is precisely one of the dangers of the Air Ministry policy to-day. The Technical Department appears to be endeavouring to fix on a few definite types of aeroplanes which can be standardised one for fighting, one for reconnaissance, one for long-range bombing and so forth whereas in the interests of aeronautical progress and of the ultimate development of the R.A.F. the whole of the equipment of the R.A.F. should be treated as experimental and every squadron should be what is called a "development" squadron.

Certain fittings and so forth which are common to every type of aeroplane might well be standardised but if the Air Force five years hence or ten years hence is to have the best possible aeroplanes then it should now have as many different types of aeroplanes as possible, that is to say each firm should be encouraged to produce its own best type of aeroplane and that type should be ordered and put into regular service use so long as it has approximately the same performance as machines built by other firms for a similar purpose. Apart from this technical point Lord Haldane's speech stands out as the utterance of a really great statesman

Former First Lords.

Lord Carson said that he did not know of a more profitable subject for debate at a time when men's minds are most likely to be disturbed for what is after all the very life of the country and of the Empire. He was disappointed at the Duke of Sutherland's statement because he had not challenged the case made by Lord Birkenhead. As a former First Lord of the Admiralty he said that the margin of safety as regards the Navy was now a minus quantity. He was not yet converted to the belief that there was at present any less necessity for a Navy than before the War. It was all very well to say that the scrapping of our ships was an act of faith. To rest defence of this country on an act of faith was an error. If they had allowed the Navy to decline to a condition in which there was no margin of safety then another arm of defence must be set up and we came back to the only thing left, the Air Service.

He recalled that before the War the Navy and the Army had separate Air Services and there was a friendly patriotic rivalry between them which in his opinion was most healthy. Each struggled to become better than any other. In further support of the separate Services he revived the old argument that when a man was too old to fly he could go back to the Navy or the Army as the case might be and that they could never offer proper inducements unless they had separate Services.

One believes that the answer to this is really quite simple. In these days any man who is reasonably fit can go on flying till he is over forty years of age and many men can fly till they are nearer fifty than forty-five without showing any signs of nerves. Therefore there is no reason why in the Air Force things should not be run exactly as they are in the Army. One does not find subalterns of forty or cadets of fifty in the Army. If a man has not got his company before he is forty he simply leaves and if he has not got his majority by the time he is fifty he leaves.

Precisely the same thing ought to obtain in the Air Force. If a man has not got his flight by the time he is forty it is perfectly evident that he is never going to get it. Also it must be remembered that the R.A.F. sees much more active service than any other Service and consequently casualties must always be higher and promotion must be more rapid. Therefore one cannot see in the least why there is any need for short service commissions or why there should be any bother about slowness in promotion.

In conclusion Lord Carson disagreed from the Government policy of hanging onto Mesopotamia and Palestine and advised us to sacrifice our commitments there in order to assure the defence of our Empire and our people.

Viscount Long of Wraxall supported the views of Lord Carson. He wanted to know whether the financial provisions for defence and our foreign policy had been taken together as one question or discussed separately. He considered that a mistake had been made when the two Flying Services were amalgamated. He believed that we were the only country which had set up a separate air administration.

To this one would reply that several other countries are considering setting up a separate Air Force and Air Ministry and are merely waiting to see how we work our separate Service before doing the same thing themselves.

He advocated the formation of a combined General Staff in preference to the Committee of Imperial Defence which had been allowed to grow too big having had added to it men who neither by force of their official position nor by their training or knowledge were in the least specially fitted to give advice on great questions of Imperial defence.

He looked forward with dismay to the time when a Ministry of Defence would be put over the First Sea Lord of the Admiralty. They would have to find a man far greater than anyone in our generation if they were going to find a man able in his own person to direct the work energies and expenditure of the three great fighting Departments.

He said that he had heard examples of the most deplorable character of the results of the divided controls at present existing. Commanders-in-Chief of foreign stations had wholly inadequate air forces under them.

One ventures to suggest that this is entirely the fault of the Admiralty seeing that the Air Ministry has already allocated to the Navy far more machines than it is at present capable of handling. Moreover it is no use former First Lords complaining about foreign stations without enough aircraft when the chief cause of complaint is that we have not enough aircraft for home defence. Whether it is the Admiralty or the Air Ministry which is to supply aircraft for foreign stations does not affect the question of how much money is to be allocated for aircraft for home defence.

Viscount Grey of Falloden said that it seemed to him that the question for this afternoon was that of the defence of this island and of the heart of the Empire. He said that so long as we were in doubt about our safety at home it became more and more imperative to reduce within the narrowest possible limits those commitments abroad which could be reduced. As to our relations with France he hoped that their Lordships would have a debate on the question after Easter He hoped that it was generally recognised in France that whatever might be the case for the moment in the long run French security depended upon friendship with Great Britain.—Something rather to that effect was said in THE AEROPLANE prior to Lord Grey's speech.

He said also that our security depended upon friendship with France to a degree that it had never done before. He said that he was not in a position to estimate the extent of the damage which could be done from the air but he imagined that it was already very great and was likely to increase. Moreover the action of aircraft could be sudden If we were

(*Continued on page* 239.)

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SUPPLEMENT TO "THE AEROPLANE"

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THE WEEKLY COMMENTARY.

The second of the articles on the modern theory of the aerofoil indicates in general outline the mechanism by which it is assumed that lift must be produced and describes the general nature of the flow round an aerofoil and the formation of vortices behind it.

The case of the aerofoil of infinite span is mentioned together with the fact that in this case the development of lift does not involve the production of drag. The infinite wing is of no practical importance, but, as will be shown in the next article, it is of some considerable importance in the devolpment of the theory and its application to wings of practical forms.

A form of direct lift machine, which in a very crude experimental form develops lift and thrust to an unexpectedly great degree, is described in this issue.

This particular apparatus is really of the nature of a flapping wing machine, but avoids some of the mechanical difficulties of the true flapper, and the very rough results available from it seem to bear out the opinions of those who hold that the flapping wing is considerably more effective than any fixed type of surface.

VORTICISM IN AERONAUTICS.—II.

By W. H. Sayers.

The "Vortex" theory of the aerofoil may be approached in several ways. Starting from the known fact that there is a difference in pressure on the two sides of an aerofoil, the theorem previously mentioned which connects pressure differences with velocity differences is sufficient to show that there is a difference in the velocity of the air on the top and on the bottom of an aerofoil. In Fig. 4 if AB represents a portion of an aerofoil, it is found that on the lower side there is an increase of pressure acting upwards and on the top side a decrease of pressure, also acting upwards.

The equation of Bernouilli—the statement of the theorem in question—at once leads to the conclusion that the velocity of the air passing the upper surface is greater than that passing the lower surface.

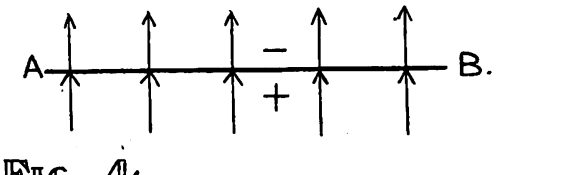

FIG. 4.

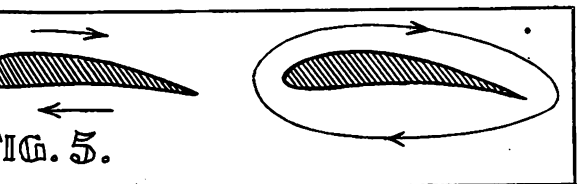

FIG. 5.

This may be represented as indicated in Fig. 5. Here the direction of the original motion of the air-stream into which an aerofoil is introduced is from left to right. The aerofoil in some manner or another sets up local velocities shown by the small arrows above and below which oppose the stream velocity below, and assist it above, the aerofoil itself. From this supposition to that of assuming a circulatory or cyclic flow right round the aerofoil, as shown in the right part of the figure is an obvious step.

The combination of such a circulation round the wing and of a velocity of translation, either of the wing itself through the fluid, or of the fluid past the wing, at once gives rise to a force at right-angles to the direction of the motion—in other words to a lift force.

In the ideal fluid of no viscosity such a circulation round an aerofoil would not be set up, but if it could be supposed to be set up it would continue to exist, and would produce a lift.

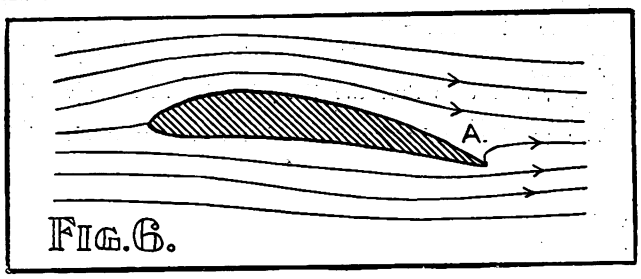

FIG. 6.

This lift would be proportional to the product of (1) strength of the circulation, (2) the velocity of the undisturbed air-stream, and (3) to the span of the aerofoil.

Just as there is no reason why such a circulation should be set up, there is no reason why, if it did come into existence, the circulation should be of any particular strength, and therefore there is no limit to the lift which might result. As a matter of fact if it were supposed that an aerofoil is in flight in the ideal fluid, carrying no load, and if one were suddenly to apply a load, then a circulation would be set up sufficient to cause a reaction equal and opposite to the impulse applied to the aerofoil. The greater this impulse, the greater the lift.

In the case of an aerofoil working in a real fluid—that is one with viscosity—there are however definite reasons why a circulation should be set up, and why the strength of the circulation should be definite under given circumstances.

Fig. 6 shows the theoretical stream-lines for a perfect fluid round a body of aerofoil section. At the point A it will be noticed that the stream-line leaving the trailing edge is sharply kinked, and is even vertical at one place. This means that there is a very high—in fact an infinite—velocity in this neighbourhood. There is no objection to this in the case of the ideal fluid—in the case of a fluid having any viscosity an infinite velocity is impossible and conditions which tend to produce very high velocities lead actually to the production of vortices.

In order that a steady, stable form of flow may be produced, it is necessary that no sudden kinks such as that at A should occur in the stream-lines, but that the stream-lines should flow smoothly round the aerofoil, those from above and below the surface should unite in nearly parallel directions at or about the trailing edge.

If a circulatory flow such as that of Fig. 7 be superposed on the flow of Fig. 6, the downward velocity of the circulation at the neighbourhood of the trailing edge will oppose the upward velocity of the stream-lines at A in Fig. 6. If the circulatory flow is of the right strength it will produce a flow such as that of Fig. 8, where the above wing and below wing-streams unite smoothly with no violent changes of velocity.

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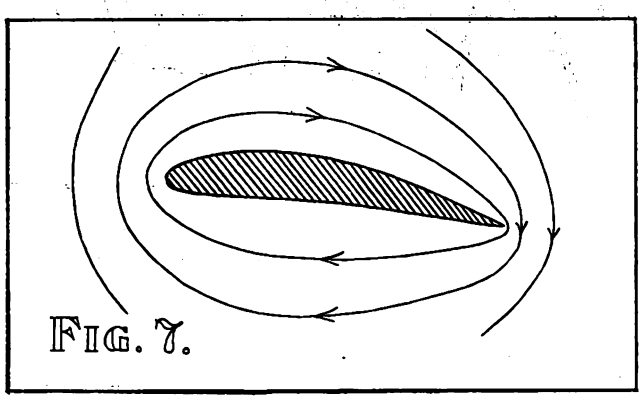

Fig. 7.

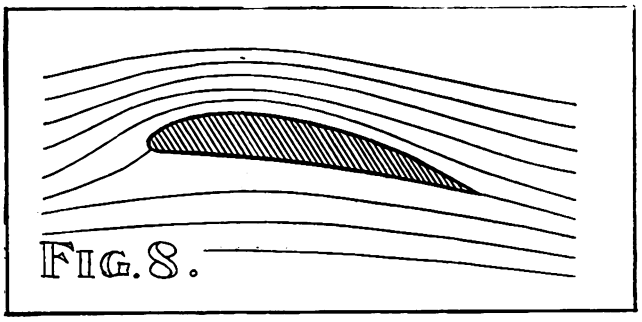

Fig. 8.

Steady conditions can then be established, and only then. The strength of the circulation necessary is thus defined as that needed to neutralise the infinite velocity at A.

It can be shown that the strength of circulation necessary for these conditions increases with increased angle of incidence, and thus that the lift will also increase with increasing angle.

The precise mechanism by which a vortex produced by the conditions at A leads to the establishment of a circulation round the whole wing cannot be simply explained. There are however well-established theorems of hydrodynamics which prove that the total circulation in any complete fluid system can neither be increased nor diminished.

If a vortex—which involves circulation—is formed at A, that vortex and its circulation will pass off down-stream, and in order that this theorem of the conservation of circulation may be satisfied, an equal and opposite circulation must be set up elsewhere in the system, and in fact would be set up round the wing.

In the ideal fluid of theory, a circulatory flow such as that postulated round the wing can have no sudden termination at the end of the wings. It must either form a closed circuit vortex ring such as the well-known smoke rings, or what are known as vortex filaments must extend from the wing-tips to infinity.

Quite independently of the hypothetical qualities of the fluid of theory it can be shown that the circulation round a real wing cannot be considered as cut off short at the wing-tips.

In Fig. 9, the top view shows a wing producing lift in end elevation. The increased pressure below, and the decreased pressure above, must obviously tend to cause a flow of air round the wing-tips as shown by thecurved arrows. The actual effect when this tendency is superimposed on the stream velocity is to cause the stream-lines below the wing to be diverted outwards as they cross the wings, while the stream-lines on top are diverted inwards. This is shown in Fig. 9, bottom—where dotted lines represent stream-lines below and full lines those above the wings. The divergence

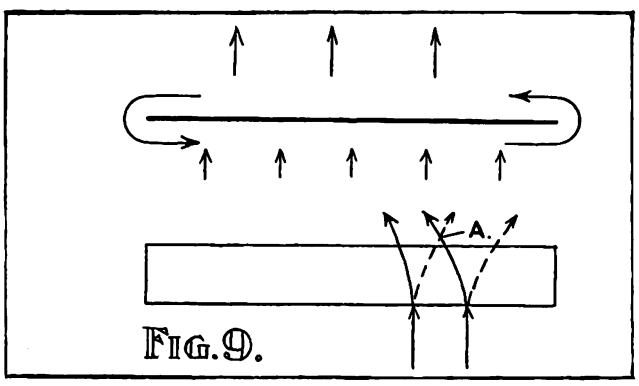

Fig. 9.

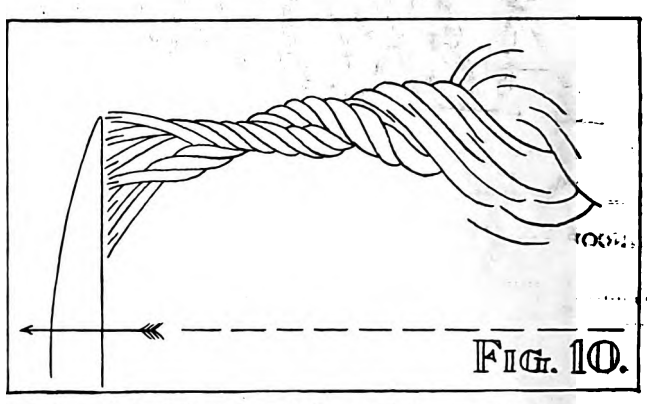

Fig. 10.

from the original direction of flow will be zero at the centre line and will increase as the tip is approached.

At A it will be seen that a top and a bottom stream-line cross each other. The result, whether one is dealing with the ideal fluid of theory, or the real fluid of fact, is that these two stream-lines will roll round one another—much as the strands of a rope—and will form a vortex filament. Thus all along the trailing edge of the aerofoil a succession of such vortex filaments is formed, those to one side of the centre-line being of opposite rotation to those on the other side of the centre-line.

Vortex filaments of the same hand are attracted together and tend to wrap round each other—and as a consequence the "sheet" of vortex filaments on each side of the wing finally roll themselves up into a sort of rope, and form a single large vortex filament trailing backwards from the neighbourhood of each wing-tip. Fig. 10, taken from Lanchester's "Aerodynamics," indicates the nature of this rolling up into one vortex system.

The flow round the wing-tips of Fig. 9 (top) is obviously a source of a loss of lift. In a similar manner each of the vortex filaments which leave the trailing edge of the wing may be regarded as a loss of circulation round the wing—that is, each vortex filament carries away some of the circulation which was present round the wing between the centre of the span and the point at which the filament leaves the wing.

As the lift is dependent on the strength of circulation the distribution of these vortex filaments along the span governs the distribution of lift along the span.

In the case of any real wing the flow is of the nature indicated in Fig. 9. That is to say that except at the centre there is movement sideways as well as fore and aft and up and down, and it is impossible to deal with the flow and its effects without taking account of these lateral divagations.

If the wing is supposed to be of infinite span however no lateral disturbance of flow occurs, for the whole of this disturbance is due to the sudden change of conditions at the wing-tip—which with infinite span is infinitely far away and therefore produces no effect.

It should here be pointed out that in this theory viscosity is only called into account so far as it is necessary to account for the production of circulation and to account for a definite value of the circulation under given conditions. No definite value has to be assigned to viscosity for this purpose—and for the sake of simplicity it is thereafter neglected. Having used viscosity to account for circulation it is assumed to vanish for all other purposes.

In the case of the wing of infinite aspect ratio the stream-lines round a symmetrical aerofoil are symmetrical fore and aft. Their form is shown in Fig. 12. It will be seen that there is an upward velocity ahead of the wing and a downward one behind the wing both of equal magnitude, and that the stream after passing the aerofoil is moving in exactly the original direction. There is a force at right-angles to the wing—a lift—and there is no drag or resistance.

It is a little difficult to understand exactly how it happens that the air is disturbed and deflected upwards before it reaches the aerofoil, but it may be to some extent explained by reference to Fig. 11, which represents a section of a plate

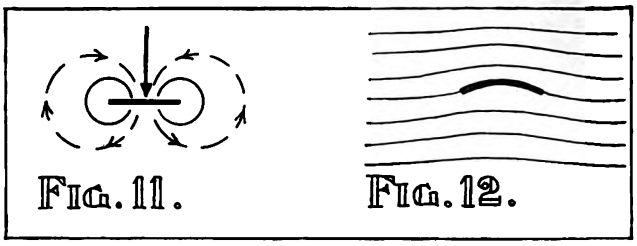

Fig. 11. Fig. 12.

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subjected to a vertical impulse in the direction shown by the large arrow. The plate is accelerated downwards. There will be a flow round the edges more or less as shown by the curved arrows. If on this flow a horizontal flow is superposed then the up-flow ahead of the wing is explained. This up-flow meets the wing, and is deflected downwards by it.

Thereafter it meets the upward flow at the rear edge which neutralises the downward deflection, leaving the final flow horizontal.

The wing of infinite span does not exist in practice, but it is to be observed that the infinite wing is only a mathematical concept used to investigate what will occur when there is no lateral disturbance of the flow over the wing—that is to say when all the stream-lines in plan-view remain parallel to the original direction of the air-stream, or of the line of flight.

(To be continued.)

AN INTERESTING DIRECT-LIFT MACHINE.

M. Passat who has been experimenting with direct-lift types of aircraft for many years has recently produced an extremely interesting arrangement of lifting and propelling surfaces which seems to be worthy of investigation.

What is to all intents and purposes a demonstration model of this arrangement was recently shown in operation to the writer at M. Passat's home in Wimbledon.

Essentially the apparatus consists of a set of wings of cambered section arranged radially round a rotating shaft. By means of a series of cams these wings are feathered, so that on the half-diameter of their circular path in which they are moving downwards the wings themselves are at a very large angle of incidence, while on the other half of the path the wings are roughly edge-on.

It is quite obvious that such a device will produce a vertical reaction, and it is also obvious if the angle of attack of the wing is correctly adjusted that a propulsive effort will be exerted.

M. Passat's model consists of a heavy rectangular wooden frame which has mounted in one of the upper corners the rotating-wing system. The wings themselves are of 3 to 4 ft. in half-span—that is the diameter of the system is between 6 and 8 ft.—with a chord of about 2 ft. at the roots, tapering to a point at the tips.

Each wing is built on one single spar—fairly far forward in the chord—and this spar is pivoted at the boss to allow of the feathering action. This feathering action is provided by cams fixed to the framework which force the wings to set themselves nearly at right-angles to the direction of motion during the downward pull of their rotation.

The wings set themselves edge-on in virtue of the air force acting on them—that is there is no positive action by the cams restoring them to this position.

The whole system is driven by an A.B.C. two-cylinder engine of the type used in the A.B.C. car— and nominally of 10 h.p. The drive is a double-reduction chain drive with a 20 to 1 gear ratio.

The whole arrangement is very crudely constructed from the engineering point of view, and the friction losses both in the transmission and in the cam-gear must be very large. Despite this the whole arrangement certainly functions in a surprisingly satisfactory way.

There were no methods available of making accurate measurements, but when the whole contrivance was mounted on rollers, with the axis of the rotating wings approximately horizontal, a thrust of between 110 and 130 lbs. was exerted.

When the axis of the wings was inclined upwards by a few degrees the side of the apparatus on which the wings were mounted lifted off the ground and advanced in an arc of a circle round the other corner of the frame.

Measurements on a spring-balance showed that a lift of at least 200 lbs. was necessary to produce this result, and the forward acceleration, despite a considerable resistance offered by pulling on a rope attached to the frame, indicated quite a large thrust—100 lbs. or so.

M. Passat stated that the engine under the demonstration conditions turned at 2,000 r.p.m., which is pretty certainly about the real speed. The engine was obviously not in good tune, and taking into account the losses in transmission, etc., it is very doubtful if more than 10 h.p. was actually being used on the wings.

It should be stated that attempts to demonstrate the lifting capacity of the apparatus with such wind as there was blowing from the rear failed, though it was evident that the frame was on the point of coming away from the ground. When facing the wind—which was of 5-8 m.p.h.—the machine lifted as already described immediately the engine was opened out.

Owing to the circumscribed space available in M. Passat's garden, and to the lack of any method of controlling the movements of the whole machine, it was possible only to run at full throttle for a few seconds—otherwise the whole affair would have turned over and crashed.

Nevertheless the demonstration was—in its way—quite convincing. A set of the Passat rotating wings—of approximately 8 ft. diameter having a total surface of not more than about 20 sq. ft. turning at about 100 r.p.m.—definitely develops a lift of about 200 lbs. and a thrust of not less than half that amount.

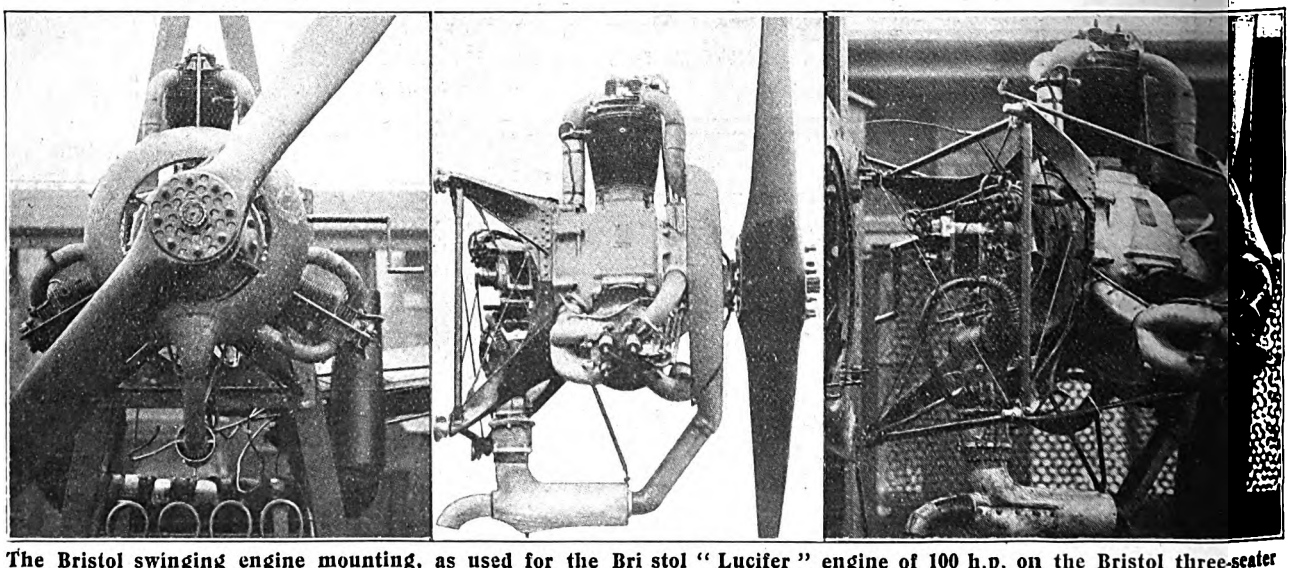
Making all allowances for the very crude construction which alone has been possible in this machine, the results obtained seem to compare very favourably indeed with any previously recorded for any direct-lift type of machine.

And therefore it certainly would seem that if money is to be spent on the development of aircraft of this type the Passat arrangement should be thoroughly investigated.

A USEFUL WORK.

[Henslowe's Motor Dictionary—English-Spanish—Spanish-English. 96 pages, 5s. net. Published by Hirschfeld Bros. Ltd.]

One has so often noticed the absence of technical accuracy in books of this nature, that the perusal of Mr. Henslowe's Motor Dictionary just published reveals a new and pleasant feature, namely the carefulness with which it has been compiled and the very wise selection of the technical words included therein. It is to be remembered that Andrieux, the French poet and man of letters of the 17th century, said: "All the other authors may be entitled to receive eulogies; the lexicographers can only aspire to escape reproaches." In the restricted space allowed by a dictionary of this size, the publishers have undoubtedly done the right thing and Aircraft Manufacturers, in so far as aviation and motoring touch one another as regards their several component parts, will



The Bristol swinging engine mounting, as used for the Bristol "Lucifer" engine of 100 h.p. on the Bristol three-seater "Taxiplane."

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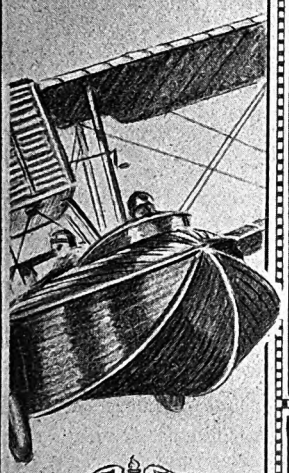

The above illustration shows a Vickers "Vanguard" (23 Passenger) Aeroplane fitted with two Napier "Lion" Engines.

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certainly find in this book a very valuable help when dealing with Spanish-speaking countries.

The dictionary should however be used with care as there appear to be certain words in it which though academically correct are not such as a Spanish motor dealer or mechanic would use. For example the word "lumbrera" is used for "port" (inlet port, etc.). The word "lumbrera" is commonly used in Spanish to mean an outlet or inlet for fire or light. Thus a wood or straw fire made by lads in the country is called a "lumbrera" because of the leaping flames, or when a hole is made in the wall of a dark room it is called a "lumbrera" because it lets in the light. Metaphorically a person whose doctrines or idealism set an example to others is called a "lumbrera" because he transports light or enthusiasm to others. But to say "lumbrera de admisión" for inlet port is not as done. The more common words are "orificio," "valvula," and "compuerta."

"Cooling" is translated by the word "refrigeracion" which is more commonly employed for the conservation of meat and fruit, etc. Mechanical people in Spain more commonly use the word "enfriamiento."

The translation of "gravity feed" by the phrase "alimentacion por diferencia de nivel" is distinctly clumsy and there are other examples of a similar nature due, apparently, to Mr. Henslowe having omitted to submit his proofs to the inspection of a Spanish motor mechanic, a species of human being doubtless somewhat hard to discover in this country. Nevertheless, on the whole the dictionary is likely to be very useful.

THE "ARCTIC" BABY.

It is already fairly well known that the "Antarctic Baby" (80-h.p. Le Rhone) which was built by A. V. Roe & Co. Ltd. for the ill-fated Antarctic Expedition has now been bought for use in seal hunting off Newfoundland and so will become the "Arctic" Baby.

Certain facts in connection with this deal are of very great interest. The actual purchasers of the machine are Job Bros. & Co. Ltd., Bowring Bros. Ltd. and Baine, Johnstone & Co. Ltd., of St. John's, Newfoundland, and the Government of Newfoundland have agreed to contribute to the expenses of the venture to some limited extent. The machine will be operated as a scout for the seal-hunting fleet by the Aerial Survey Company (Newfoundland) Ltd. under the direction of Mr. Sidney Cotton. The negotiations on this side of the water have been conducted by Major Hemming, formerly of the Aerial Survey Company and now of the Aircraft Operating Company, of 8, New Square, Lincoln's Inn.

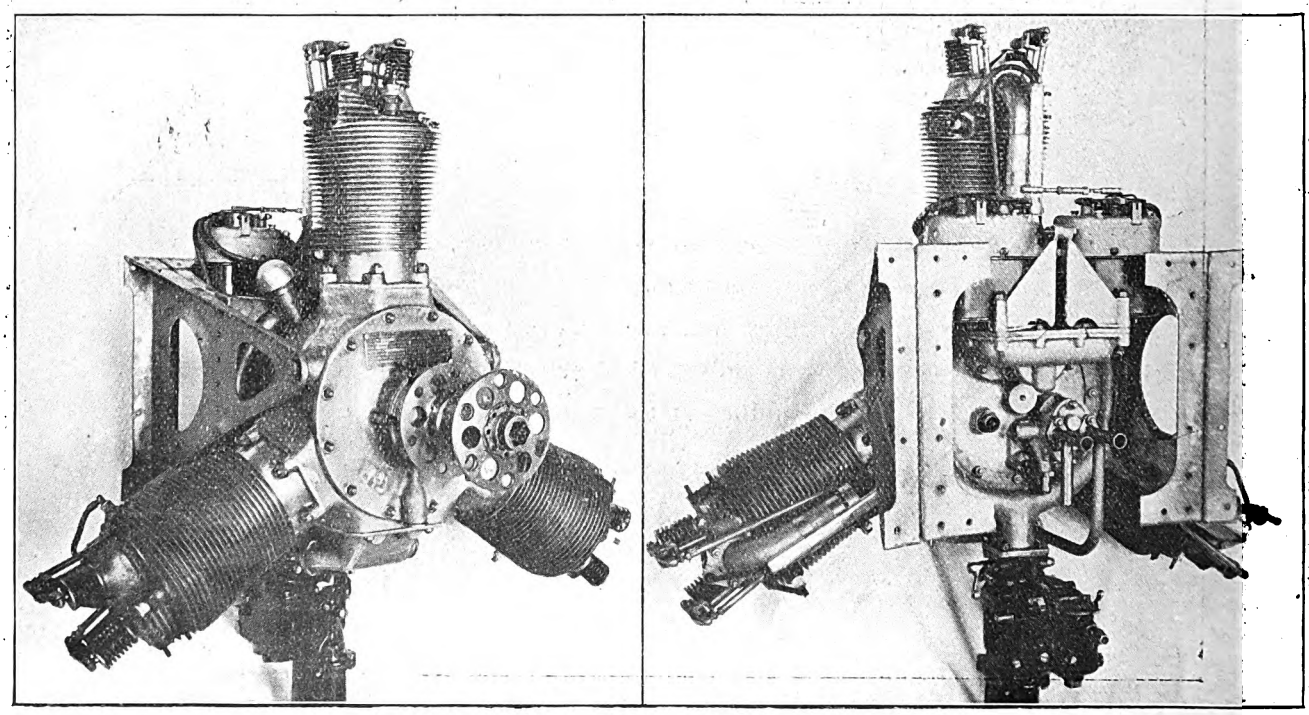
As was mentioned in this paper some time ago seal hunting is only carried on for a few weeks in the Spring when the young seals are still on the ice and have not taken to the water. This means that the sealing ships have to penetrate inside the ice-floes for a considerable distance, frequently up to 60 miles or more. Thus it is probable that the "Baby" Avro will be used with skiis quite as much as with floats.

The three firms who have combined to purchase the aeroplane have been actively interested in the Newfoundland trade for very many years and are to-day the oldest business houses in the Colony of Newfoundland. Job Brothers for example were established in 1760 and the others very nearly about the same time. These three firms have always been the most important in sealing ventures and sealing has for more than a century been next to cod fishing the most important industry of the colony. At first the work was done in open boats and these were succeeded by sealing vessels up to 300 tons of various rigs—schooners, brigs, barques, brigantines and so forth. At one time the number of vessels fitted out at St. John's was about 300 and something like 7,000 men were employed.

As time went on the sailing vessels were replaced by steamers, at first of wood from 200 to 500 tons register, and afterwards of steel. One of the old wooden steamers, the S.S. *Neptune*, has been employed on sealing work for 50 years. The steel steamers which came into being about 1910 were naturally of larger size, running from 300 tons up to the S.S. *Stephano* of about 2,000 tons. Most of these steel sealing steamers were sold to the Russians in 1915 and 1916 for use in the White Sea and some of them are still there, though others have gone the way of many steamers used during the war. Curiously enough, the *Stephano* was the first British steamer to be sunk by German submarines off the coast of the United States.

With these steel steamers of increased size it is possible to carry a small aeroplane such as the Avro "Baby" on board, which naturally makes air scouting for the seal packs a very much better proposition than it was a year or two years ago when Mr. Cotton had to start from and return to his aerodrome at Botwood near St. John's. That meant that he had to fly many hundreds of miles over ice-floes depending entirely on his engine, for if his engine had failed although he might conceivably have got down into the water between the floes he would have had little chance of ever being rescued. The Avro "Baby" working from the sealing fleet itself will need a much smaller radius of action.

The catch of seals varies immensely. It has been as high as 600,000 in a year and as low as 50,000. The average of recent years has been about 150,000 according to the number of steamers employed and according to the combined luck and judgment of the skippers in estimating the direction and drift of the ice-floes on which the seals were lying. During the two years in which Mr. Cotton was working from his land base he found that the sealing fleet had taken a very wrong direction and would have caught but little if it had not been re-directed by the aeroplane. If the "Baby" Avro should prove successful this year it will certainly increase the catch of seals very considerably and in that case ought to pay for its cost and upkeep in its first year.



An American low-power air-cooled engine. The 60-h.p. three-cylinder Lawrance Engine, used successfully on several small American aeroplanes.

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(*Continued from page 228.*)

to consider the question of safety in the air we should have to consider not merely the proportion of strength at the moment of existing air forces but what was meant by expansion in both trained personnel and in material.

He really thought that we were on the brink as regards Air Forces certainly of a new competition in armament and that a general reduction could only be achieved by making the League of Nations more comprehensive and stronger.

Vital Disclosures.

The Marquess of Salisbury terminating the Debate for the Government said that there was no quarrel between us and France; merely a difference of opinion as to methods.

He disclosed the fact that the Earl of Balfour and Lord Weir had both consented to serve on the Committee of Imperial Defence for the purposes of inquiry into the adjustment of responsibilities between the Navy and the Air Force. The Committee had already had two sittings and it had discussed "the degree to which the Navy is not so all-important as it was and must be supplemented by the Air Service."

This is very good news as it is generally known that the Air Force has no better friends than the noble Lords mentioned.

As to relative air power he thought that Lord Birkenhead had somewhat underrated the air power that other nations than France might produce in the near future. We had by no means reached the limit of the development of air power either in the numbers or in the character of the machines. Their scope was getting wider every day, the distance over which they could travel, the time during which they could keep the air, were all developing. He said that the obligations thrown upon the Air Service would be far wider than the mere defence of London.

As to whether there should be two Air Services or only one and as to the exact relations which ought to obtain between the Air Service and the Navy he asked their Lordships and the country in this respect to trust the Government. He ended by saying: "The Committee is in full session. The Government hope within a relatively brief period to announce to Parliament and the country the result of their deliberations, and to obtain, as I am sure they will, the support of all sections of opinion in another place and in your Lordships' House."

[*The Report of the Debate in the House of Commons will be published next week.*]

ON AVIATION IN RUSSIA.

Now that the time is rapidly approaching for the Russian Napoleon to make himself manifest it is worth while to pay particular attention to the developments of aviation in Russia. The Russian himself is nothing of an aircraft designer or mechanic but some Russians are very good pilots and an immense Russian air fleet, properly organised by competent officers of high rank, would certainly be the greatest possible menace to the safety of European civilisation.

It must not be forgotten that crude as it was the original Sikorski four-engined biplane was in fact the ancestor of all the big multiple-engined aeroplanes of the War and of those which have been built since the War. The Sikorski was one believes the only aeroplane of any consequence designed and built in Russia and considering how few aeroplanes even of foreign design were built in that country it is significant that so important an ancestor should have been produced there.

It is said that Sikorski himself is at present in the employ of a French aircraft firm, but so far as one can gather Sikorski was purely an engineer who conceived the idea of the multiple-engined aeroplane and carried out the design and construction of details. What is much more important is that Professor Slessareff, who was the bright particular star of Russian Aeronautical Science under His late Imperial Majesty the Tzar, is to-day the scientific and technical head of all things aeronautical under the Soviet Government. There has always been a suspicion that Slessareff is something of a genius in aerodynamic science and therefore his presence in Russia is of much greater importance than that of even the most skilful aeronautical engineer. It will always be possible for the Russian Government to hire engineers.

Russia's Scheme.

In this connection the following article in the *Daily Telegraph* is particularly of interest:—

"Ostensibly Russian, but designed, built, and operated by German designers, constructors, and pilots, a great fleet of 5,000 aeroplanes is now to be equipped and flown within Russian territory. With the assistance of German aeronautical experts the Soviet Government has just completed a survey of the aerial possibilities of Russia, and a new exploitation of these vast territories, initiated and maintained by air, is what is aimed at now.

"Great trunk air lines have been mapped out by the German experts, and a technical expert in the official air organ of the Soviet authorities now declares that the Russian airway potentialities are becoming so vast that by 1926 the great air factories which are now being established here and there in Russian territory will be called upon to turn out several thousands of new commercial aeroplanes each year in order to cope with the ever-increasing demands for 'flying stock.'

"This 'air restoration' of Russia, providing a swift, constant communication, will, their German advisers have told the Soviet Government, effect bigger practical results in a few months than could be achieved by other means in years. From the astute German point of view the scheme will provide a unique method for German engineers not only to gain just the experience which is now required in widespread airway operation, but also in detailed 'air express' construction and in actual day-and-night pilotage on long routes."

The Commission Inter-Alliée Again.

The great schemes for "great trunk air lines" matter very little compared with the existence in Russia of a fleet of 5,000 aeroplanes even after making due allowance for the fact that the figure may be due merely to journalistic optimism.

Unfortunately owing to the idiotic regulations of the Commission Aéronautique Inter-Alliée, German aeronautical engineers, pilots and mechanics have been compelled to emigrate from Germany. Several very important German aircraft firms have moved into neutral countries, for instance Dornier has gone to Italy, Caspar is in Sweden, Sablatnig has moved to Denmark, the Maybach people have their experimental engine plant in Holland and so forth. These moves are reducing Germany's power of paying indemnities by removing from the country valuable sources of revenue and incidentally they establish German connections in foreign countries where, as they will be producing their machines in these countries, they stand an excellent chance of getting any orders these countries may place for war machines.

Everything that the Commission Aéronautique Inter-Alliée has done to crush German aviation will react eventually in favour of German aviation or at any rate to the detriment of the ex-Allies and in nothing has this shown so much as in this matter of the Russian air fleet. Designers, constructors, pilots and mechanics who might have been working steadily in Germany improving commercial aircraft for the good of the World have been forced into Russia, where although they have no love for the Russians they are definitely teaching the Russians how to construct aeroplanes and how to pilot them.

Germany and Bolshevism.

Some of one's German friends have expressed the opinion that Germany is very close to Bolshevism owing to the fall of the mark making paupers of the respectable middle class people who have hitherto lived on fixed salaries and incomes. In spite of this one believes that the individual respectable hard-working God-fearing German while he hates and despises the Frenchman hates the Russian still worse and fears him in addition. He knows that no atrocities during the War were equal to those committed by the Russian Imperial troops in East Prussia and that Bolshevist atrocities were far worse. The ruin of the middle classes in Germany caused by the fall of the mark might conceivably lead to a species of middle class Soviet Government but one does not believe that the Germans will ever "go Bolshie."

Therefore one is not greatly exercised in mind by the suggestion implicit in the *Telegraph's* article that the German aeronautical people working in Russia are helping to bring about an understanding between Russian Bolsheviks and German Bolsheviks. On the contrary one believes that the ordinary German who is compelled to live and work in Russia by the present state of aeronautics in Germany will come back with an increased hatred of everything Russian.

The Other View.

There is a great deal in the *Telegraph's* suggestion that the Germans now working in Russia will gain at the Soviet's expense experience which will be very valuable to them hereafter in Germany. This experience of course will be to our advantage in that when we and the Germans have to fight the Slavs we shall have at our disposal the experience of all the Germans who have worked and flown in Russia.

All things have a curious habit of working together for the good of England and therefore one is not particularly afraid of any evil resulting directly from the fact that these Germans are working in Russia. It is true that they will teach the Russians a great deal about how to run aircraft efficiently and it is quite possible that a number of them will even remain in Russia and help the Russian Napoleon when the war begins, just as we had in our Air Force during the War quite a number of highly efficient officers of German descent. But that is merely the fortune of war. The great thing is at present to watch as carefully as is possible the developments of aviation in Russia by the Russians themsedves for therein lies much the greatest danger in the next war.—C. G. G.

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R.A.F. INTELLIGENCE

Appointments.

From "*The London Gazette.*"

AIR MINISTRY, Mar. 6.—R.A.F.: Grp/Capt. C. S. Burnett, C.B.E., D.S.O., is appointed Deputy Director of Operations and Intelligence vice Grp/Capt. J. A. Chamier, C.M.G., D.S.O., O.B.E., Feb. 23.

GENERAL DUTIES BRANCH.—F/O. G. A. H. Pidcock is granted a permanent commission, Oct. 24/19 (since promoted); Wing/Cdr. H. A. Williamson, C.M.G., A.F.C., is restored to full pay from half-pay, Feb. 19.

AIR MINISTRY, Mar. 13.—R.A.F. GENERAL DUTIES BRANCH: F/Lt. C. S. Wynne-Eyton, D.S.O., is granted a permanent commission, Jan. 5/21 (since promoted); Wing/Cdr. J. Mead, C.B.E., M.C., is placed on the retired list on account of ill-health contracted on active service, Mar. 14.

The R.A.F Reserve.

There has been such a ready response from old pilots who wish to join the R.A.F. Reserve that the London Establishment is now completed and training will begin at Stag Lane on May 1.

The response in the provinces however has not been so good and there are still vacancies in the Bristol and Coventry districts for 60 officers each and 80 in the Glasgow district. The reason that the response from the provinces has not been so ready as in the London district is due to the fact that applicants have very rightly kicked against paying the heavy railway fare necessary to come to London for their interview and medical examination. To get over this difficulty the Air Ministry are arranging for a travelling medical board to visit the big provincial centres and notice will be given in due course when the performances will take place.

There is to be no military training of any kind and only flying instruction will take place. Training will be arranged so far as is compatible with the efficiency of the force so as to fit in with officers' spare time. Presumably if one is going to have a slack afternoon in the office one rings up one's reserve station and books a machine for a definite time.

This is of course all very nice but there are many who were hoping that for their period of training they would be posted to a Service station and so live for a time in the R.A.F. atmosphere, which can only be obtained under strict disciplinary conditions.

If pilots who are still engaged in flying in civil life are eligible for this joy-riding in place of others who are now occupied in other walks of life it seems rather a waste of public money. There should be a special course for civil pilots enabling them to get the benefit of the latest form of R.A.F. training on the latest type of R.A.F. machines. To make them float round on D.H.9s and Avros if that be the intention is wasting their time and public money when there are others far more in need of flying re-training.—G. D.

THE R.A.F. SPORTS BULLETIN.

(Issued in Collaboration with the R.A.F. Sports Board.)

The Cross Country Championship.

The fourth Annual Championship was held at Uxbridge on Mar. 17 over a total course of 6½ miles. As usual there was an excellent entry, teams from 27 stations being entered, making, with the individual entries, a field of 200. Cpl. Clarke (Halton) who won last year again repeated his success by winning in an easy fashion by 150 yds. The first team in the list of placings was S. of Technical Training (Manston), who beat No. 4 Section, Halton, by a margin of 31 pts.

The full list of finishers is:—1, Cpl. Clarke, Halton I (41.15); 2, L/AC. Harrison, Netheravon (41.44); 3, AC. Morgan, Manston (42.10); 4, AC. Wright, Cranwell (Boys) (42.19); 5, AC. Taylor, Manston (42.38); 6, AC. Edney, I. of Grain (42.53); 7, AC. Turner, Old Sarum (42.59); 8, L/AC. Lowdell, Netheravon (43.10); 9, AC. Jackson, Henlow A (43.32); 10, S/Ldr. A. J. Capel, Cranwell (43.33).

11, AC. Jarrett, Calshot (43.43); 12, AC. Coveny, Henlow C. (43.44); 13, F/O. Carter, Calshot (43.47); 14, AC. James, Gosport (43.48); 15, AC. Liddell, Halton (4 sec.) (43.49); 16, AC. Deverall, Halton (4 sec.) (43.59); 17, Cpl. Ward, Netheravon (44.9); 18, AC. Read, Uxbridge (44.14); 19, AC. Williams, Manston (44.15); 20, L/AC. Bird, Cranwell (Boys) (44.16).

21, AC. Grierson, Halton (4 sec.) (44.16 1-5); 22, Boy Mutch, Cranwell (Boys) (44.22); 23, AC. Osborne, Uxbridge (44.22 1-5); 24, Boy Lowther, Halton I (44.27); 25, Boy Ballard, Halton I (44.27 1-5); 26, S/Ldr. W. R. Read, Cranwell Col. (44.30); 27, AC. Thraves, I. of Grain (44.42); 28, L/AC. Lawton, Netheravon (44.45); 29, AC. Tucker, Flowerdown (Men) (44.47); 30, AC. Southard, Halton (4 sec.) (44.47 1-5).

31, L/AC. Simple, Calshot (44.48); 32, AC. Stevens, Kenley (44.48 1-5); 33, AC. Oxley, Uxbridge (44.49); 34, AC. Dale, Halton (4 sec.) (44.59); 35, Boy Akhurst, Halton I. (45.0); 36, L/AC. Lister, Netheravon (45.5); 37, F/O. Muschamp, Uxbridge (45.6); 38, Boy West, Halton II (45.7); 39, Boy Floyd, Halton II (45.8); 40, L/AC. Fennel, Manston (45.14).

41, AC. Ellis, Manston (45.16); 42, AC. Champion, Eastchurch (45.17); 43, Boy Ellaby, Cranwell (Boys) (45.19); 44, AC. Green, Duxford (45.20); 45, AC. Whyte, Manston (45.21); 46, AC. Stenhouse, Calshot (45.21 1-5); 47, Boy Clarke, Flowerdown (Boys) (45.23), 48, AC. Cox, Henlow (A) (45.26); 49, Boy Beaumont, Halton I (45.45); 50, AC. Fuller, Cranwell Col. (45.47).

TEAM PLACINGS.—1, Manston: 3, 5, 19, 40, 41, 45, 153; 2, Halton, No. 4 Sec.: 15, 16, 21, 30, 34, 68, 184; 3, Halton I: 1, 24, 25, 35, 40, 52, 186; 4, Netheravon, 199; 5, Cranwell, Boys' Wing, 281; 6, Cranwell College, 287; 7, Henlow, A team, 342; 8, Gosport, Base, 365; 9, Halton II, 431; 10, Eastchurch, 444; 11, Isle of Grain, 453; 12, Uxbridge, 516; 13, Flowerdown (Boys), 623; 14, Old Sarum, 645; 15, Kenley, 651; 16, Halton, No. 5 Sec., 676; 17, Farnborough, 737; 18, Spittlegate, 743; 19, Martlesham Heath, 748.

The Semi-Final of the R.A.F. Rugby Cup.

R.A.F. RECORDS, RUISLIP, v. No. 1 F.T.S., NETHERAVON.—This match was played at Aldershot on Mar. 14, under good weather conditions.

Netheravon won the toss and started with the wind at their back. For some 10 or 15 minutes play was mostly among the forwards, then Usher and Adams broke away with the ball at their feet from a loose scrum and although checked once or twice, the ball was eventually grounded over the line by another Netheravon forward, the kick being successful. After another 10 minutes' play in the centre of the field the Ruislip fly-half tried a kick for touch which was charged down, and Usher gathering the ball forced himself over for a fine try, which he failed to convert. At half-time Netheravon were leading by 8—0. Up to this point play had been fairly even, with the Netheravon backs handling badly, and it looked as if the game would become very close now that Ruislip had the wind in their favour.

The second half was mostly contested in the Ruislip territory, for with the exception of several long kicks to touch by Ruislip, the ball was kept very close and the Netheravon forwards were nearly over on two or three occasions. After about 20 minutes' play a Ruislip player was penalised for offside during a scrum almost under the posts, but the kick at goal failed. Shortly after the ball was cleanly heeled on the touch-line and travelling from Miller to Snaith the latter cut in and running strongly swerved past the back and grounded under the posts. Usher's kick was successful. Netheravon won a hard, clean game by 2 goals and a try (13 points) to nil.

The teams were:—Netheravon.—F/Lt. Fenwick, AC. Gordon, L/AC. Snaith, F/Lt. Marson, F/Lt. Earp; F/O. Rose and AC. Miller; F/Lt. Usher, F/Lt. James, F/Lt. Lees, F/O. Adams, F/O. Lowe, P/O. Reynolds, Cpl. Grosse, Cpl. Hordley.

Ruislip.—AC. Hampton, Cpl. Jones, L/AC. Palmer, L/AC.

THE ENGINE REPAIR DEPOT, R.A.F., ASSOCIATION FOOTBALL TEAM, ABBASSIA, EGYPT.—Eight of this team represented the R.A.F. against the Army in Egypt, the match resulting in a draw. The team has also won the Premier Football Cup of Egypt, the R.A.F. League (Cairo District) and were the runners-up for the R.A.F. Cup, Egypt, and of the Military League (Cairo District). Standing (left to right) AC/2 Gavin, AC/1 Guest, L/AC. Collett, AC/2 Sambrooke, AC/2 Milligan, Cpl. Steadman, AC/1 Taylor, AC/2 Crabtree, AC/2 Cowley. Seated:—AC/2 Green, AC/1 Hare, S/Ldr. A. Corbett-Wilson, F/O. W. E. Townsend, AC/2 Underhill, AC/2 Mathers.

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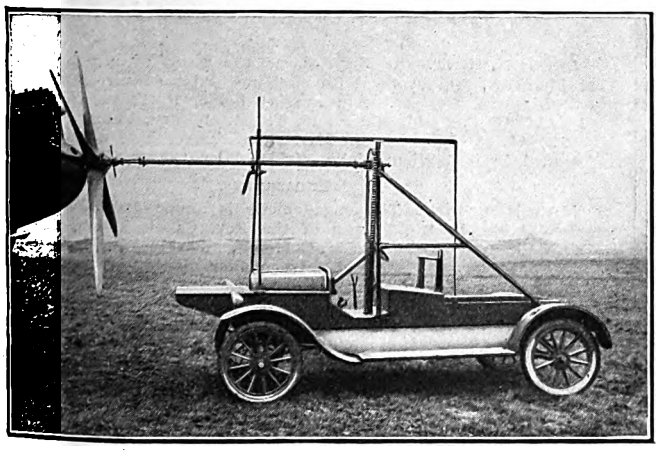

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Cosgrove, AC. Johns; AC. Allen and AC. Smith; Cpl. Hall, Cpl. Johnson, Cpl. Keane, AC. Haines, AC. Wall, AC. Davies, AC. Goodes, AC. Pledge.

R.A.F., Iraq—1922-23.

Polo :—An R.A.F. H.Q. Team composed as follows :—Air Vice-Marshal Sir J. M. Salmond, Grp/Capt. Hon. J. D. Boyle, Wing/Cmdr. R. C. S. Bradley and Wing/Cmdr. G. St. P. de Dombasle (back), were winners of the "Bonham-Carter" Cup for Iraq—1923. In the two previous years, this cup was won by the 7th D.G.'s and the 2nd Batt. the Norfolk Regt. respectively.

Tennis :—Tennis is extremely popular, and the available courts are always fully utilised. S/Ldr. R. E. Saul was the outstanding figure in the Baghdad Lawn Tennis Tournament which was played off during November last. He won the open singles, the open mixed doubles (partnering Mrs. Prescott) and won the handicap men's doubles (partnering Col. Prescott). A large tournament comprising several events will be played off during "Baghdad Week."

Shooting :—Week-end parties have had plenty of sport during the Winter. The combined bag obtained by a party of three guns shooting on an average two full days per month over Oct. to Feb. included the following :—178 partridge, 200 duck, 25 geese, 11 hare, 60 quail, 184 sand-grouse.

Rugby :—Rugby football in Iraq suffers from the vagaries of the weather, which made it rarely possible to arrange games on anything but the shortest notice. Rain falls only at irregular intervals and the nature of the ground is such that, while it is far too slippery to be played on immediately after rain, it dries and hardens very quickly and play is not possible after three or four rainless days.

In spite of this disadvantage, however, every effort has been made to keep the game alive both in Baghdad and Basrah. In Basrah, where the ground presents less difficulties, sides representing the R.A.F., Basrah City and Abadan have played several times, and good games have resulted.

Association Football :—All R.A.F. Units in the Baghdad Area entered one or more teams in the Baghdad Sports League, and the majority had a successful season.

Iraq Aircraft Depot "A" were the outstanding team; they headed the western section of the League, and also won the Overland Cup for the second year in succession, thus making the cup their own property.

In addition to the League and Cup matches, four representative games have so far been played; two between teams representing Baghdad and Hinaidi, and two between the R.A.F. and the Rest. In the latter games, the Rest won the first by 5 goals to 1, while the second was a draw, each side scoring once.

AN R.A.F. FLIER.—"Eternity" by Tomas-an-Appagh—Winter Queen. Winner of the Service Plate (Meerut), Baldoyle Plate (Ambala), Service Plate (Ambala), and Knavesmire Plate (Rawalpindi), during the Racing Season 1921-1922 in India. She established a fine record for Up-Country Racing by being placed 10 times in her 13 races, securing 4 firsts, 4 seconds and 2 thirds. The mare is trained by Brig. General L. G. F. Gordon, C.B., D.S.O., and owned by Flight-Lieut. V. S. Erskine-Lindop, 28 Squadron, R.A.F., Kohat, who is a member of the Sandown Park Club and well known in Racing Circles up-country in India.

THE INTERNATIONAL AIR CONGRESS.

Grp/Capt. H.R.H. the Duke of York, K.G., R.A.F., who is President of the International Air Congress which is to be held in London during the last week of June, has signified his intention of being present at a reception of the Members of the Congress on Monday evening, June 25.

The Rt. Hon. the Lord Mayor of London will hold a reception for the Members of the Congress at the Mansion House from 9-11 p.m. on Wednesday evening, June 27th.

THE BEAUMONT CUP.

Some weeks ago The Aeroplane stated that "Commodore" Beaumont, an American citizen long resident in Paris, had offered a prize for an International Speed Race to take the place of the Deutsch Cup now won outright by France.

A notice has now appeared in the papers emanating apparently from the Aero Club de France to the effect that the race will take place on Oct. 15 next. There will be a cup and a prize of 60,000 francs for the winner both this year and next, the only condition yet announced being that the speed of the winner must exceed 290 k.p.h. In the event of the prize not being won this year, next year's prize will be 120,000 francs.

It is also stated that the *venue* of the race will be Istres near Marseilles. May one suggest to the Aero Club of France that owing to the enormous interest taken in these speed events by the British, it would be a very graceful act if the event would take place at an aerodrome more accessible to England? Etampes was always bad enough to reach but Istres will be impossible for most people. Why not one of the aerodromes in the vicinity of Paris, Le Bourget for preference, as then busy English people could get home the same night?

It is a moral certainty that the Gloucestershire Aircraft Company will build a new Napier-engined racer to Mr. Folland's design for Mr. Larry Carter to fly and it is possible that some other British firms such as the Bristol and Blackburn people may think it worth while to compete for the prize seeing that the world-wide prestige of winning such an event is so great.—G. D

PERSONAL NOTICES.

Deaths.

BROOKE-HUNT.—On Mar. 26, as the result of a flying accident, at Shotwick, Robert Cecil Brooke-Hunt, Pilot Officer, R.A.F.

TODD.—On Mar. 11, at a nursing home, Kathleen Winifred, wife of F/Lt. H. C. Todd, R.A.F., 16, Tideswell Road, Putney, S.W.15.

WRIDE.—At Shotwick, on Mar. 27, as the result of a flying accident, Leonard Basil William Blake Wride, Pilot Officer, R.A.F.

Engagement.

MARSH—SNOOK.—The engagement is announced of Mr. Francis Caldwell Marsh, R.A.F., son of the Rev. Canon Marsh, of St. Ives, Cornwall, and of the late Mrs. Marsh, and Muriel Elizabeth Curtis, only daughter of Mr. and Mrs. Walter Snook, of San Francisco, California.

LOCK—FORD.—The engagement is announced between F/Lt. Henry George Watts Lock, D.F.C., R.A.F., third son of Mr. C. V. Lock and and Mrs. Lock, of Sturminster-Marshall, Dorset, and Phyllis, only daughter of Mr. P. G. Ford and Mrs. Ford, of Burwood, Clatford, Andover.

GIFFORD—MARTIN.—A marriage has been arranged, and will shortly take place at Messina, between Captain Barry Gifford, late R.A.F., and A.D.C. to his Highness the Rajah of Sarawak, and Janet Ripley, only child of Mr. and Mrs H. M. Martin, of New Haven, Connecticut, U.S.A.

ANDREWS—BISDEE.—The marriage arranged between F/Lt. J. O. Andrews, D.S.O., M.C., only son of the late John Andrews and Mrs. Hartmann, of Sudbury, Middlesex, and Bertha Winifred, eldest daughter of Mr. and Mrs. Wilfred Bisdee, of Hambrook, Glos., will take place on Apr. 14.

Marriages.

PHILCOX—INGRAM.—On Mar. 24, at St Luke's, West Norwood, Capt. William Stuart Philcox, D.F.C., B.A., only son of Mr. and Mrs. C. W. Philcox, of 2, Lancaster Road, West Norwood, to Nora Angela Rose, second daughter of Mr. and Mrs. Herbert Ingram, of 12, Lancaster Road, West Norwood.

STONE—CLAY.—On Mar. 16, at St Simon's Church, S.W., by Rev. Hector Reindorp, Cecil John, R.A.F., only son of Captain Stone, and nephew of Colonel and Mrs. Lambart, to Beatrice, only daughter of Colonel and Mrs. B. G. Clay, Cavalry Depot, Canterbury.

Births.

CRAWFORD.—On Mar. 3, at St. Clements, Grantham, to Winifred, wife of F/O. C. Crawford—a daughter.

DE HAVILLAND.—On Feb. 28, in London, to Monna, wife of Maj. Hereward de Havilland, D.S.O.—a son.

KERSHAW.—On Mar. 8, 1923, at Seacourt, Hayling Island, to Iris, wife of S/Ldr. R. H. Kershaw, R.A.F.—a daughter.

REILLY.—On Mar. 19, at 60, Junction Road, Andover, to Isabel, wife of Wing/Cmdr. H. L. Reilly, R.A.F.—a daughter.

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 16; Tuesday, 14; Wednesday, 13; Thursday, Friday, 3; Saturday, 16; Sunday, 3.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 10*, passengers, 83; Air Union, machines 18†, passengers 43; Total machines 28, passengers, 126.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 16*, passengers 59.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 13, passengers, Manchester-London, 17, London-Amsterdam, 12.

LONDON—ROTTERDAM:

K.L.M., machines 12, passengers 18.

SPECIAL MACHINES, LONDON-PARIS:

De Havilland Aircraft Co., Ltd., machines 2, passengers 2.

Total number of trips by British machines: 41, carrying 173 pas.

Foreign machines: 30, carrying 61 pas.

STATISTICS.

For week ending Mar. 25:—

Machines, 71; Passengers, 234; Crews, 122; Total Personnel, 356

Corresponding week last year:—

Machines, 50; Passengers, 129; Crews, 84; Total Personnel, 213

Corresponding week, 1921:—

Machines, 44; Passengers, 168; Crews, 62; Total Personnel, 230.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

The passenger statistics are still on the upward trend. Handley Page Transport utterly routed the Air Union this week carrying on the London-Paris route 83 passengers to the Air Union's 43. Owing to the rush of passengers H.P.T. have had to hand over the bulk of their goods traffic to the French combine.

It is said that Handley Page Transport and the Daimler Airway have come to an agreement whereby the latter will operate one D.H.34 on the Paris route to help cope with the rush of traffic during the coming season. This machine will make its two return trips per day as last year and thus afford accommodation for some 40 extra passengers per day.

Mr. Frank Courtney has been flying for the Daimler Airway in lieu of Mr. Hinchliffe who has been unwell. One is told that Mr. Donald Herne is shortly to leave the Daimler Airway. Being interested in messages in the ether he is to join Major Savage's band of skywriters in America.

It is understood that the Instone Air Line have won their arbitration case against Vickers Ltd., and on Monday of this week Mr. Cyril Holmes took one of the Vulcans back to Brooklands. One gathers that these machines are now to be fitted with Napier engines.

On Saturday Mr. Barnard took the Instone D.H.4a to Cambridge to pick up a special passenger, whom he afterwards took to Paris.

Mr. C. D. Barnard, who took Lady Carnarvon and a specialist to Paris last week, *en route* for Cairo to attend to Lord Tut-Ankh-Arnarvon, returned on Saturday on a D.H.9. One gathers that the cessation of Lady Carnarvon's journey by air was not caused by air-sickness but by the fact that messages received in Paris indicated that extreme haste was no longer necessary.

Lt.-Col. G. L. P. Henderson has been flying the Surrey Flying Services Avro during the week-end as Messrs. Muir and Youell have not yet returned from Spain. Mr. Shaw has been out periodically on the Marconi Avro carrying out wireless tests.

The Disposal Company, as is always their practice, are returning good for evil and are repairing the Goliath which attacked their "Put and Take" hut last week and detrimented itself and the hut.

Mr. Perry has been carrying out some tests on the boosted "Tinsyde" and Capt. Rex Stocken has been flying the Renault Avro. It is stated that the Polish pilot who is to fly the monoplane with the variable cambered wing is none other than our esteemed friend, "Count Vodka," which is, of course, one of the personalities of the ubiquitous Mr. Maurice Piercey.—G. D.

GOOD HUNTING.

Last week owing to a silly printer's error one was made to say that Lord Edward Grosvenor when in Italy did "some very gallant bombing work over the Australian lines." Although Lord Edward specialised in long-range bombing his range did not in fact extend from the Isonzo to the Somme. And although admittedly anybody who went bombing over the Australian lines would have to be very gallant indeed, for the "Aussies" have a way of getting their own back, there was no quarrel between the democratic Australians and the aristocratic Grosvenor. The name Grosvenor, incidentally, is derived from the French *gros veneur*, which may have meant either a large hunter or chief huntsman, and in this case it was merely Austrians and not Australians who were being hunted.—C. G. G.

THE RETURN TO THE AIR.

A pilot who has been temporarily re-mobilised after some years "ashore" writes:—

"We are expecting a few articles from you in the near future on your impressions of pilots retaking the air after a couple of years as long-shoremen. I refer to the 'Defence Corps.'

"My own impression is that we all take to it like ducks to water, although a little out at first in judgment of gliding distances, etc. There is no doubt that a pilot—although a good one—can get into bad habits and that a short course 'dual' with a Gosport man can do him no harm.

"It is rather a sweeping statement but I observe that a pilot who has been a test pilot during the war, although an excellent and steady flier, has no idea of tackling a machine for the 'scrap.' Also the pilot-instructor, busy making perfect turns and landings, is just a trifle slow in scrapping. What I mean to say is that bad flying—flat turns and side-slips—puts a gunner off more than a machine flying perfectly, when its course can be mentally calculated.

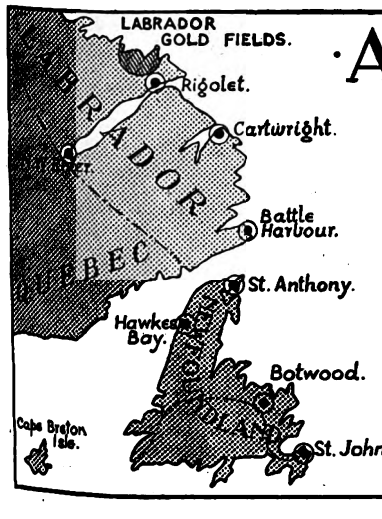
"I further suggest that a 'Hun' before leaving Avros to go onto single-seater rotary scouts should first pass out with a solo on an Avro piloted from the front seat.

"Further, I consider that the R.A.F. could teach a man a good bit more about good shooting if a suitable range were built with a high speed moving target that had to be hit.

"Why should the right-angle-to-direction-of-flight-shot be considered a difficult one? I believe Ball suggested putting a bunch of shot in front of his opponent and letting him fly into it. Sounds easy?

"I do not make these remarks in the light of the expert. As a matter of fact I was shot down by a Fokker and had the pleasure of comparing notes with the gentleman in hospital afterwards. We both agreed that it was easy to fly and do most difficult evolutions with your head twisted back looking at your tail, if you had someone there of interest. The chief thing was the shooting.

"There is also the devilry of landings. . . ."



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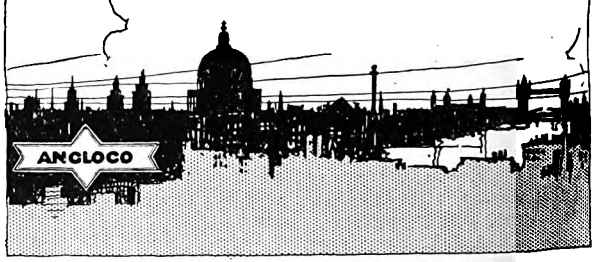

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THE AEROPLANE

Edited by C.G. Grey

WEDNESDAY, APRIL 4, 1923.

Vol. XXIV. No. 14. SIXPENCE WEEKLY. [Registered at the G.P.O. as a Newspaper.]

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GOOD FORMATION.

OVER HOLLAND:—An excellent picture taken from a photographic machine belonging to the Royal Flying Corps of the Netherlands Navy of a formation of Fokker Biplanes. The civilian pilots of the Netherlands flying for the K.L.M. have shown us their high quality and this photograph shows how well trained are that country's Service pilots.

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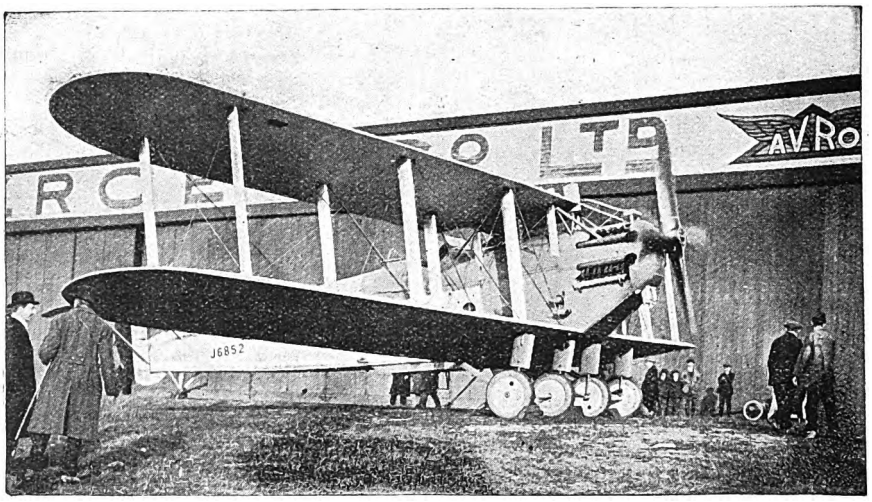
AVRO LEADS AGAIN!



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APRIL 4. 1923.

THE AEROPLANE

VOL. XXIV. No. 14.

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ON "THE DAILY MAIL" AND THE ROYAL AIR FORCE.

In the days quite recently when Captain the Honourable Frederick Guest, D.S.O., was Secretary of State for Air one had frequently the honour and pleasure of recording in this paper the good work which he was doing for the Royal Air Force and the excellent way in which he was doing it. When owing to political changes he left the Air Ministry and was left out of Parliament by the free and unintelligent voter his absence from both places was keenly regretted by all who served under and with him, for it was feared that it would be some time before he could do any more good work for the Service which already owed him so much gratitude. Happily Captain Guest has found and seized with good will an opportunity of which he alone could make full use, and he does not seem to have missed a single chance.

It will be remembered that on Mar. 23 *The Daily Mail* in a leading article attacked the Royal Air Force and the Air Ministry in a manner which was at once grossly unfair and grossly misleading. In one's own humble way one endeavoured to reply to that attack and one imagines that various other people must have sent more or less similar replies, none of which were published. But though the *Mail* could refuse to publish the replies of such inconsiderable people as the writers of those letters it could not very well refuse to give space to a former Air Minister. The result has been that on Mar. 28 it published a letter from Captain Guest.

Certain passages which demand special attention have been set in italics. Otherwise the letter appeared exactly as follows:—

An Adequate Reply.

Sir,—In your leading article of Mar. 23 headed "Our Royal Ground Force" I read with great regret that, while inveighing against the Government's policy of continued occupation of the mandated territories of Mesopotamia and Palestine, now almost entirely performed by the Royal Air Force, *you have introduced with surprising irrelevance a bitter, ill-informed, and even graceless attack* upon the Royal Air Force itself.

Whether the policy of the present Government is sound or unsound, surely the Royal Air Force is not responsible for it, and it seems hardly fair to employ the policy of the Government, with which you disagree, as a stick with which to beat the Royal Air Force. Incidentally, if these territories are to be occupied and controlled by the Forces of the Crown, *it has been proved beyond dispute that the use of the Royal Air Force in this connection, perhaps for the very reason that there are no opposing air units, is by far the cheapest way of accomplishing the task.* Estimates for 1922-23 for the Middle East indicated a reduction from 27 millions to 13 millions.

For many years *The Daily Mail* was a strong supporter of the development of the British air arm, and therefore an attack from your quarter comes as an additional surprise.

Further, the Royal Air Force during its short career has owed a great deal to the sympathetic interest and support that you have in the past so unfailingly extended to it during the difficult task of establishing itself as an Independent Force, *in spite of the sour glances and secret kicks which have been surreptitiously administered to it by the older sister Services.*

You may say that it is not my business any more to defend the Royal Air Force, but as I am deeply interested in its future, and have no place in Parliament from which to speak, I have no other method of stating my views except through the columns of the Press.

Your attack develops under the following heads:—

1. That the eighteen squadrons in the Near and Middle East should be brought home before the new fifteen squadrons are raised for home defence. This opens up the entire question of the Government's policy of the British position, not only in Mesopotamia, Transjordania and Palestine, but also in Egypt and Aden, where I think it will be found at least six of these eighteen squadrons are centred.

It is probable that the squadrons in Egypt are saving money and maintaining with equal success, and far more economically, *a military position of the greatest importance to the Empire.*

2. Your second charge—viz., that the whole Air Force is both wasteful and inefficient—is so sweeping that it can only be answered by an equally general reply.

From my own experience, both as a Minister and for many years a professional soldier, although of humble status, *I am satisfied that the administration and efficiency of the Royal Air Force compares favourably, to say the least of it, with either of the other Services,* and I am further supported in this view by the report of the Geddes Committee, which explicitly says in Page 8 of the First Interim Report on National Expenditure, 1922, "that they are not convinced (in spite of charges to the contrary of the other Services) that the Air Force is less economically administered than the other fighting Services."

3. You then state that the Royal Air Force is a Royal Ground Force and that it is organised for every conceivable purpose except flying.

As far as I can see, this statement is based upon an attempt on your part to compare the relative number of men to each flying machine fit for service that it takes, firstly, the French, secondly, ourselves, to keep in the air.

Successive Secretaries of State have, times without number, explained that no comparison of any value between the two Forces is possible.

Firstly, the fact that the bulk of our force is on active service renders all training with those squadrons impossible, and consequently involves the upkeep of our training establishment at home.

Secondly, the French conscript their mechanics ready-made, while we have to train them expensively from boys.

Thirdly, the French supply a very large quota of personnel from their regular military forces, who consequently never appear upon the establishment of their flying service.

Fourthly, not only are our squadrons larger than theirs, but the squadron itself has to keep its own 100 per cent. reserve of machines in perfect flying order. To the best of my knowledge the French have no such system.

Fifthly, the Air Ministry provides the entire staff for the administration of the R.A.F., to which there is no corresponding office in the French Air Service.

Sixthly, *the whole principle of our highly-condensed and concentrated Air Force has been to maintain it at such a pitch of efficiency and elasticity as to be able to cope with any rapid requirements for expansion.*

Lastly, I am satisfied that *our flying units show a higher ratio of successful flying hours than the corresponding units of any other nation, not excluding the French.*

On the question of expense, this charge of wastefulness must, I presume, also be made by comparison with the similar performance of some other country, again presumably France. I spent more than a year endeavouring to extract from the French Budgets what they actually did spend on their Air Services, and I defy anyone to ascertain. Allowance has to be made for the cost of the overhead charges, auxiliary services, such as medical, transport and repairs, all of which are inextricably embedded in other general military votes. Then some calculation must be made which allows for the assistance that the French Air Service receives from Army personnel and paid for in the military Budget. And when you add to these intangible figures the main factor of the reduced pay of the conscript, *it is apparent that even the roughest computation as to the cost of any given French Air unit is practically unobtainable.*

Your next charge is that the R.A.F. is inefficient. Do you mean that they fly badly, and, if so, in what way? Have they failed to carry out any appointed task? Will you tell me which?

In Iraq 96 machines are practically doing the work of 26 battalions, long after the War Office said it was dangerous to take any of them away.

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In Somaliland, on two occasions at intervals of two years, they have quelled disturbances and saved costly infantry expeditions.

In India, if only the military authorities and the Government of India were not so obstinate, the extended use of the R.A.F. would save the Indian Budget millions a year.

I remember that at the outbreak of the Chanak difficulties last October the one cry was for the R.A.F., and I have heard nothing but praise, even from soldiers, of their efficient work in that area.

The official figures you quote of "372 machines maintained by some 3,000 officers and 27,000 men" is misleading. The figure 372 is obtained by multiplying 31 squadrons by 12 machines apiece. Why should the hundred per cent. immediate reserve with the units kept in flying trim be ignored, to say nothing of quantities of war stocks (becoming obsolete, I admit) which the same force has to take care of.

Your further point is a small one and can be dismissed in a sentence.

You scoff at the names "Air Marshal," etc., and "Dental Squadron Leader." "Air Marshal" means "Major-General." "Dental Squadron Leader" means "Major R.A.M.C." in Army parlance, but as long as you have a separate Air Force you must have distinctive titles. Surely anyone will admit that.

Your last charge, that the Ministry cost £648,000 out of a net Budget of £12,000,000, does, I admit, require explanation. It is quite simple. Practically everything is concentrated in Kingsway. There are no outlying high commands with staffs and headquarters. There is only one Inland Area Command and one Coastal Command. There are no admirals of the fleet ashore, such as at Portsmouth, for instance, the expense of which I do not think is shown in the annual cost of the Admiralty, the figure for which you state to be £1,280,000 a year. *All this has been most carefully planned by the frugal-minded Chief of the Air Staff so that all the avenues for waste shall be closed by his powerful hand.*

In conclusion, I see that *you have quoted a retired officer of the R.A.F., Major-General Sir Frederick Sykes, as having permitted himself the liberty of suggesting that the tendency of those in control of the R.A.F. "was not to push flying."*

I never read a more undeserved or cruel charge. Almost day by day one reads of accidents, many of which have been fatal to young flying officers bravely fulfilling their duties.

I am amazed that an ex-officer of the R.A.F., whatever his career may have been, should allow himself to speak lightly of the daily risks which are being taken by these gallant boys, and surely *he must know from his own short experience as Chief of the Air Staff from 1918 to 1919 that an immense reponsibility of precious lives now rests upon the shoulders of the great officer who succeeded him and still holds that important post.*

I wish I could also persuade your Air Correspondent to go and see the old patched-up war service huts that the bulk of the R.A.F. still live in. What a pity it is he cannot go to one of the flying schools and take a series of flights both by night and by day and see whether he really thinks the care of machines and lives is overdone. I believe he would end by saying that not only have the R.A.F. put up with grave discomfort without grumbling, but the care of machines and the personnel involved had better be left in the hands of those who are not only responsible for the lives of the pilots but have made an exhaustive study of the whole problem.

Yours faithfully,
FREDERICK GUEST.

Turf Club, Piccadilly,
Mar. 25, 1923.

A Brief Comment.

It will be noticed that Captain Guest, like the sportsman he is, sends his letter from the Turf Club and not from one of the more serious political clubs to which he belongs. The point is a small one, but it is indicative of the man.

Barring the slight slip of saying that "Air-Marshal" means "Major-General" when in fact it means "Lieutenant-General," the whole letter is a marvel of accurate information and clear-cut reasoning. And in certain passages Capt. Guest rises to a level of corrosive invective which hitherto has been attained in print only by Mr. Ernest Newman and Mr. Bretherton. The phrase "a bitter, ill-informed, and even graceless attack" has a peculiar literary charm. But it is surpassed by the reference to "a retired officer of the R.A.F." "as having permitted himself the liberty of suggesting" that the tendency was not to push flying. And that is capped by the further phrases directed to General Sykes, "whatever his career may have been" and "his own short experience as Chief of the Air Staff."

One imagines that General Sykes must now feel some regret that he ever took the liberty of using the unfortunate phrase which gave Lord Rothermore (or his servant) the chance of quoting him against "the great officer who succeeded him and still holds that important post." In fact one feels rather sorry for General Sykes for he has always meant well and has been genuinely keen on doing his best for aviation. Even if he did not agree with some of his colleagues and even if he may have shown some lack of decision or a little peevishness at times such a very incisive attack as that delivered by Captain Guest seems a trifle hard. Still Captain Guest was Air Minister when General Sykes was Controller-General of Civil Aviation, so doubtless he knows a great deal more than any mere looker-on can know.

Be that as it may, Captain Guest has done a very great service to the Royal Air Force, as great as anything which he did during his term of office. One can only hope that ere long Captain Guest may soon find a seat in Parliament where he can continue to help the Service which he has so much at heart and that the swing of the political pendulum may in due course send him back to the Air Ministry.

A Feeble Reply.

To Captain Guest's effective attack the best the *Mail* could do was to repeat its libellous heading and follow it thus:—

"OUR ROYAL GROUND FORCE."

"In another column Captain the Hon. Frederick Guest replies at length to our recent criticisms of the administration of the Royal Air Force. Although he has no seat in Parliament, Captain Guest has a right to be heard on this subject, because he was Secretary for Air in the late Coalition Ministry. We shall deal with his strictures when we return to the question of the air defences of this country. Meanwhile all that need be said is that the interest of the *Daily Mail* in aviation has not weakened, as Captain Guest appears to suppose, and it is for that reason that we are dissatisfied with the present management of the Royal Air Force We want a powerful and efficient Air Force, stationed in Great Britain. At present the Air Force is neither powerful nor efficient, and it is being chiefly used for the defence of Baghdad."

Nothing more feeble as a retort could well be imagined. The *Mail* is to deal with Captain Guest when it returns to the questions of air defences. That is to say it can choose to wait till Captain Guest's cutting remarks have been forgotten and it can reply only to those points on which it can scratch up some sort of reply.

As to the *Mail's* interest in aviation not having weakened one can well believe it. Lord Rothermere is not a man who easily forgives or forgets a defeat and he seems to lack sufficient intellect or magnanimity to recognise when his defeat has been deserved. Apparently he has never forgiven Sir Hugh Trenchard for leaving him "in the air" early in 1918, in such a position that he (Lord Rothermere, certainly the most incompetent possible Air Minister) was compelled to resign and make way for Lord Weir, who proved extraordinarily competent and managed to clear up a great deal of the mess which Lord Rothermere had made. That being so one can readily understand how and why the chief proprietor and director of the *Mail* is "dissatisfied with the present management of the Royal Air Force" and is determined, so far as lies in his power, to smash Sir Hugh Trenchard and if necessary the efficiency of the Air Force with him.

Happily the Air Force knows its Trenchard and is prepared to back him through thick and thin, and it does not know its Rothermere and does not particularly desire so to do. Therefore these scurrilous attacks on the R.A.F. are not likely to damage the moral and esprit de corps of the Force as they might if the personnel had less loyalty to their Chief and if the attacks were delivered by one whose opinions on air affairs were of higher value.

As to the defence of Baghdad. If Lord Rothermere has no anti-Persian interests to stir him to this line of attack then he must be even more stupid than one believes him to be if he cannot see that the defence of our Persian oil supplies is of prime importance to the defence of the Empire in general and of London in particular. One has no high opinion of Lord Rothermere's intelligence, except as a hypertrophied shop-keeper who manages to sell quantities of cheap newspapers, but one can scarcely imagine that even he can suppose that a force of aeroplanes can defend London, including the sources of his own wealth, unless they have petrol and oil. And if the sources of that petrol and oil are not defended then the air defence forces cannot have them. Baghdad covers the Anglo-Persian oil fields from attack and Mosul covers Baghdad. That is why we are in Iraq and Palestine. And the sooner the fact is thoroughly understood the better.

Meantime it is a pity that the *Mail*, which could do so much for the progress of aviation if its energies were properly directed, should be used to further Lord Rothermere's private feuds.—C. G. G.

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ON THE COMMONS.*

The Report stage of the Air Debate took place in the House of Commons on Mar. 21. The first speaker was **Major Sir Archibald Sinclair** who in the pre-war days was interested in the famous "Secret Circle" machine invented by the late Cedric Lee—there is a joyous story of his introducing the pilot, the late Gordon Bell, to Mr. Churchill and Sir John French, as he then was, when they went to inspect the machine. Sir Archibald took the very sensible view that in the event of a sudden outbreak of war instead of the enemy Air Force bombing London it would first of all attack our aerodromes and factories. One believes that whether it did so or not would depend on whether the enemy were controlled by fighting men, as Germany was in the last war, or by politicians, as we were.

He said that he had no faith in defence from the ground but that a small highly-trained Air Force might repeat the same sort of tactics by which Drake brought the Spanish Armada to confusion. On the other hand counter-attack might be the best form of defence. These were questions for the Air Staff and not for that House.

He believed that in the next war it would be difficult to make London the headquarters of our operations. And he laid down the admirable axiom that we require an aerial organisation capable of rapid expansion on foundations which will have to be laid and we require an independent Air Force to meet the strategic needs of the Empire. Nothing should be done to weaken the Air Force or to circumscribe the functions of the Air Staff.

Personaliy he would have liked to have seen a larger proportion of the Appropriation devoted to research. He expressed the opinion that Civil Aviation was the only foundation for expansion of the number of pilots and mechanics and suggested that the Air Ministry should establish a service from London to Glasgow and on to the Highlands, and he welcomed the encouragement given to air racing.

He thought that the talk about our being overshadowed by France was all nonsense. He said that we could not consent to remain indefinitely and permanently in a condition of inferiority to any other European Power. He said that France regarded herself as the warden of the New Europe and she was greatly concerned for her security and for the security of her Allies, Poland and Czecho-Slovakia. To a Frenchman it would be just as absurd to believe that the French Army including its Air Service was a menace to British interests as that the British Navy was a menace to French interests. Two factors were making for a reduction in French armament, namely, the Commission appointed to consider drafting an agreement guaranteeing the frontiers of European Powers and secondly the fact that the French taxpayer will be no more willing than the British to maintain unnecessary armament. The instinct of the British people opposed to disarmament would not be satisfied unless the Government put itself consistently behind the League of Nations for peace and disarmament.

Altogether this was a thoroughly able maiden speech and one only regrets that space makes it impossible to reproduce it in full.

Lieut.-Commdr. Burney said that the problem was how to provide an aerial organisation without having at any period to reverse our organisation, firstly because we had the careers of officers to consider and secondly because we had to form a large General Staff and thirdly because there was the necessity for saturating the minds of the senior officers with the air spirit. Having reviewed weapons of war through the ages, from teeth and toenails to Big Bertha and the modern aeroplane, he then considered the functions of the fighting Services and made the astonishing statement that the aeroplane to-day is comparatively useless for Imperial purposes because it is so limited in its range of action, which naturally led to his pet subject of airships. From such insufficient premises he drew the very sound conclusion that a combination of the Admiralty and Air Ministry so far as staffwork was concerned was necessary in order to prevent overlapping as the range of aircraft increased. He ended by saying that he would like to see the Secretary of State for Air and the First Sea Lord the political counterparts of the Siamese Twins rather than of the Kilkenny Cats—surely Commander Burney meant the Chief of the Air Staff and the First Sea Lord or else the S. of S. for Air and the First Lord of the Admiralty.

Mr. Ben Turner said that he was wondering where the Washington Convention came in in connection with the Air Service. He said that he was "becoming shocked somewhat by the talk of returning now to the days of brabbarism." [It is not quite clear whether this is merely a misprint in Hansard or whether it is a reference to the militaristic mind of the Member for Chatham.]

Mr. Turner confessed himself one of those simple-minded men who believe that force is an evil. One merely wonders what Mr. Turner will do if he met methods of barbarism in a lonely lane on a dark night.

He referred sorrowfully to the time "when the Germans in their wickedness came across and bombarded our towns and our people" and added "It seems to me that if bombing was wrong by Germany it is wrong at all times, whether it is done by ourselves or anybody else." Like so many Labour members Mr. Turner displays a lamentable ignorance of human nature and even of the scheme of creation, and while presumably a disciple of Karl Marx apparently does not appreciate the excellent axiom of another German philosopher that war is a biological necessity. One takes it that Mr. Turner is not a bloated capitalist but where would Mr. Turner's household belongings be if we had no policemen or only policemen without the power to exercise force when necessary?

Captain W. Brass advocated a Ministry of Defence overriding all three Services and said that it was wrong for the Navy to have to ask the Air Ministry whether they could have certain machines or not. He pointed out that except for a few countries round this island the Navy was still our First Line of Defence of our Dominions and Overseas possessions and that the Navy wanted its own machines for spotting, reconnaissance, torpedoing and so forth. He wanted to know what Service would control a flying boat which might possibly in the future be able to fold its wings and dive into the sea and become a sort of submarine. One suggests that probably the Chaplain's service would be the most appropriate.

Further he contended that airships should be part of the Navy. Whether gunfire was observed from the turret of a ship or a kite-balloon or an aeroplane or an airship it was still naval work. He said that the present position was absurd. He had been told the other day that if the Air Ministry wished to make an experiment with aircraft carriers they got the carriers from the Navy and might go out for two or three weeks making deck-landing experiments and when they came back the Navy charged the Air Force with the amount of oil fuel that has been used in experiments intended to try and make the Navy more efficient. On one occasion a seaplane co-operating with the Navy alighted in the middle of the Channel and was towed in by a destroyer after which the Navy sent in a bill to the Air Ministry for the oil used by the destroyer in towing the seaplane to port. That was an absurd state of affairs.

Mr. George Lambert who is apparently a pacifist like Mr. Turner lamented the necessity for preparing for war and the money which it cost to do so but apparently objected to shutting down dockyards on the grounds that you could not throw the men out of work. It strikes one that it is far less important to throw out of work dockyard men who are only accustomed to working on obsolete products than it is to throw out of work aircraft hands who have only recently been trained in the construction of the most modern weapons.

After that the kind-hearted Mr. Lambert lamented the hardships which our men were suffering in being sent to Mosul because unfortunately he had received a letter describing how one detachment had to march from 09.00 hours till after midnight on a windy day with rain and sleet, which after all is somewhat unusual in Iraq. Apparently Mr. Lambert imagined that troop-carrying aeroplanes ought to have been used for the conveyance of this draft and believes that our little campaigns all over the World can be conducted from those vehicles so excellently arranged by what a humorous friend calls "The Company International of the Waggon-Beds." He reiterated all the old nonsense about the R.A.F. being used for tax-collecting and in a general way showed a most wonderfully intimate and at the same time inaccurate knowledge of his whole subject.

Commander Bellairs raked up the ancient arguments about expenditure on bricks and mortar and fell into the very common error of imagining that the R.A.F. Staff College at Andover has cost a lot of money, being happily ignorant of the fact that it merely exists in a war-time hut. He like so many other Members advocated the spending of money on Civil Aviation in order to maintain our Aircraft Industry, happily forgetting that of any money spent on Civil Aviation 75 per cent. or thereabouts goes on running expenses and not on aircraft at all and that if Civil Aviation is organised on the lines of the Daimler Airway the output of aeroplanes after the first equipment of flying stock is delivered will be practically nil per annum.

Mr. Robert Nichol, Member for East Renfrew, referring to Commdr. Burney's reference to the evolution of weapons said that he had recently been reading histories that gave an inkling of debates in the Roman Senate and in the Carthaginian Council Chambers and found that there they had the same arguments as in that House to-day, namely that neither of those nations could exist unless they had greater armament and greater forces than their rivals.—After all history seems to bear out the argument very well.

[* N.B.—This title has no reference to Bank Holiday Resorts.]

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Continuing, he said "Cant apart, I think it is a commonplace to say that in a discussion of the Air Force in this House the one idea that is behind the minds of every Member is the very great disparity between the Air Force of this country and that of our late Ally. There has been a change caused by the War. Germany has been displaced as the bogey. A very ineffective bogey it was before the War, but like most bogeys it gains a very great reality if we are all going to carry on until it does become something, not only a reality, but an obsession in all our minds." Mr. Nichol suggested that if the interests in this country decided that France was not going to get ahead in Europe in the air some of the aeroplanes might be conveniently sold to Germany for fighting the French.

A hundred years ago we subsidised the Russians to fight Napoleon. The quick-change artist was more evident just now than in any other time in our history. If we were going to have a race in armaments there was no use in discussing housing subsidies. We ought to be discussing the question of constructing rabbit-holes and dug-outs for the population.

If we were going to differentiate this moment in history from the history of the last two thousand years what was required was for some nation in a strong position and with big armaments to decide that for its own part it was not going to have these armaments any longer. By such a policy we should live in a much more dangerous position. But he felt that we had got to live dangerously in the future and the only alternative was that we were going to use all our substance in war preparations and in the ambulance work which comes after the war. It only needed another two wars like the last and we should find ourselves doing nothing else in Great Britain but preparing for the next war and bandaging our wounds for the last.

One suggests that this is precisely what humanity has been doing ever since humanity began to exist and what it is likely to go on doing till man ceases to be a predatory animal, and learns to grow his eyes at the sides of his head.

Major-Gen. Sir J. Davidson said that he was glad to see the sense of the House veering round towards the establishment of some machinery for co-ordinating the work of the Services. He thought that the Air Force Estimates were too meagre altogether and that we ran a very great risk with a Force of the size for which we were estimating to-day.

Admiral Sueter also thought that the Air Estimates were far too low. It was not right that the Navy should take all the money and the Air Service get so little. He quoted Admiral Sims, U.S. Navy, as saying that the battleship had become obsolete against aeroplanes. He would like to see the Air Estimates extended by another £10,000,000.

The Air Force should be just as efficient as was the old Army Expeditionary Force. The Air Minister was not taking enough money for his Reserves. More help should be given to Civil Aviation. He did not like the monopoly implied in the £2,000,000 scheme and he wanted to know what the Air Minister proposed to do with those pioneers who had been carrying out all the work in establishing the airways.

As former Director of the Air Department Admiralty he quoted the efforts his department had made to develop torpedo machines and how all their efforts were turned down by the Admiralty and he said that all the time they were developing the Naval Air Service the Sea Lords of the Admiralty were blocking it.

Sir Samuel Hoare replying on the debate complimented Sir Archibald Sinclair on having made one of the most attractive maiden speeches he had ever heard in the House. He agreed with all that had been said about the horrors of warfare in the future and the desirability of some general guarantee against a return to the old and vicious race of armaments. The difficulty seemed to be to find any form of guarantee that did not mean a promise of some definite force in the way of intervention.

As to friction between departments he was afraid that as long as the World went on there would always be a certain amount of friction. The Secretary of State disposed of Commander Bellair's foolish statement about bricks and mortar by pointing out that the R.A.F. had to have permanent buildings to replace war-time huts and said that the fact that the Air Force Staff College existed in war-time huts accounted for the fact that it did not appear as a separate item in the Air Force Estimates. He also said that the buildings at Halton had to be suitable to house about 2,000 boys who were being educated as air mechanics and that the cost of the buildings compared extraordinarily favourably with the buildings of schools or colleges under any department of State or any municipal authority.

He declined to enter into controversy on the subject of the Admiralty. And as to Civil Aviation he said that he was second to none in his views as to the potential value of Civil Aviation. He was most anxious for any advice which any Members could give him on this subject. As to the Camp at Hinaidi near Baghdad he said that most of the work had been done by the War Office and that 80 or 90 per cent. had already been completed and that it was necessary for the health of the men that the rest should be completed. As to Mosul his information was that the health of the men was excellent.

Rear-Admiral Sir Guy Gaunt pleaded breezily but without serious argument that the Navy should be allowed to run its own Air Force.

Capt. Wedgwood Benn added a little to his speech of Mar. 14 pointing out that there was little essential difference between the machines used for naval aviation and for pure Air Force work and that the problems of material which applied to one class of aeroplane applied to all classes of aeroplanes and that therefore it would be a mistake to let the Navy handle its own supplies. He also pointed out that some of the very best pilots and most gallant fighters in the R.A.F. were a great obstacle to advancing aerial navigation as such as they flew too much by sight and not enough by instruments and that therefore aviators in the future would need to be much more specialised than they are at present and could not belong to any other than the Air Service.

On the whole it was an interesting and useful debate, for it showed the Air Ministry precisely the line of the attack which it will have to meet in the future. How much effect the public attacks, such as those in the House and in the Harmsworth Press and in the *Morning Post*, will affect the ultimate issue is impossible to gauge. The time has not yet come when the Air will turn a bye-election at the behest of Lord Rothermere as the Housing Question swung a few thousand voters at Mitcham and delivered a seat to the Socialists. Therefore misrepresentation in the Press is hardly likely to have much practical effect and it may be useful in stirring up public interest in the Air Force. When once people become interested they are likely to seek the truth and not to accept the *obiter dicta* of Lord Rothermere and Mr. Lovat Fraser. And so, as the Buddhist doctrine has it, all things work together for good.—C. G. G.

THE NEW AIR TRANSPORT COMPANY.

The Air Ministry announce that they are still prepared to receive proposals from responsible persons for the formation of an Air Transport Company on the lines indicated by the Secretary of State for Air in the House of Commons on Mar. 14, arising out of the recommendations of the Civil Air Transport Subsidies ("Hambling") Committee (Cd. paper 1811).

As the proposed company may have to start operations on Apr. 1, 1924, it is desirable that it should come into existence at an early date. The Air Ministry, without imposing a specific time limit for offers, desire to announce that they hold themselves at liberty to close with any offer which they regard as satisfactory by July 1st; and in order that offers may receive full consideration it will be advisable that outline proposals should be made by May 1st.

Proposals should be addressed to the Secretary, Air Ministry, Adastral House, Kingsway, W.C.2.

[This would appear to give the lie to the persistent rumour that the new company has already been arranged. As a matter of fact it does not, for on the principle that there is many a slip 'twixt the cup and the lip it is always possible that the Air Ministry may be wishful to cover itself in case the rumoured company may not materialise. Also it is not at all unusual for a Government Department to ask for tenders after a contract has been virtually fixed verbally.—Ed.]

THE R.A.F. MEMORIAL FUND.

The excellent administration of the R.A.F. Memorial Fund is shown by the figures relating to the last three months of 1922 supplied by Lieut.-Col. Burch, the Secretary to the Fund. The total amount issued in grants to ex-members of the R.A.F. during that period was £1,132 2s. 8d. The number of cases dealt with in the office of the Fund, exclusive of ex-officers, was 165. Ex-officers are dealt with on behalf of the Fund by the Officers' Association.

Generally speaking the grants come under such heads as general maintenance, maintenance during sickness and fees at convalescent homes; grants for clothing, etc., and to redeem pawned property; loans to establish small businesses and grants for the purchase of tools; payment of arrears of rent, insurance, rates, etc.; rail fares and accommodation at Y.M.C.A. huts; funeral expenses.

During the three months under consideration a total of £59 11s. was granted to members of the post-war R.A.F., chiefly for the payment of pressing legal charges but also including six maternity grants of £3 each, a payment for son's convalescence and another for maintenance whilst visiting a son in hospital.

The headings given above are only a rough idea of the assistance given and the amounts given vary so much that they are not included in detail.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The articles on the vortex theory of aerofoils are continued below. Experimental checks, as regards the application of the theory to the wing of infinite span, are described, and the method by which the theory is applied to wings of finite span is explained.

An interesting design for a low-powered aeroplane of quite high performance is described and illustrated in this issue. The publication of this design is of considerable topical interest in view of the announcement, also to be found in this issue, of a competition for aeroplanes more or less of this type, which is to be held in the autumn of this year.

Notice of the formation of the British Marine Air Navigation Company, which is to operate seaplane services between Southampton, Le Havre, Cherbourg, and the Channel Islands, is given on page 256.

VORTICISM IN AERONAUTICS.—III.

By W. H. Sayers.

As a matter of fact it is possible to approach very closely indeed in practice to this simplified type of flow of the infinite wing by testing an aerofoil in the wind-channel between vertical partitions touching the end of the wing and extending upwards to the limit of the moving air-stream.

It is not possible to set such partitions in actual contact with the wing-tips, as the friction between wing and partition will make it impossible accurately to measure the forces on the wing, but it is possible to devise forms of "labyrinth" packing which reduce leakage round the wing-tip to a very small amount, and which still leaves the wing absolutely free within narrow limits.

A wing under these conditions simulates very closely the conditions which occur in the infinite wing of theory.

Experimental Checks on the Theory.

As long ago as 1914 Dr. A. Betz, of Göttingen, calculated the lift coefficient at various angles of incidence for an infinite wing of what is known as the Joukowski type, and tested a model of such a wing in the wind-tunnel under conditions such as those outlined above. The results of this experiment are shown by the curve of Fig. 13. The dotted line is the calculated lift coefficient, the full line nearly parallel thereto is the experimental lift coefficient. The full line which is roughly horizontal with a turn-up at each end is the experimental drag coefficient. The theoretical drag is everywhere zero.

It is obvious that the real lift is everywhere less than the theoretical, and that while the theoretical lift continually increases as the angle of incidence increases the real lift ceases to increase and falls off at an angle of about 10°. At the same time the difference is not very great until fairly close to the critical angle at 10°.

The real drag is everywhere of appreciable magnitude instead of being zero, but over the range from $-7\frac{1}{2}°$ to $+5°$ it is sensibly constant, and it is in fact of about the value which would be accounted for by the known skin-friction drag of a plane of the same area as the wing.

This agreement between theory and experiment is far closer than any which had before been found. The discrepancies are of the kind which would be expected to result from the effects of viscosity which are regarded as negligible in the theory, and the only really disconcerting feature is the failure of theory to give any indication of the sudden falling off in lift at the critical angle of the real aerofoil.

It may here be remarked that up to the present this phenomenon has not been satisfactorily explained. It may be said however that it is pretty certainly a viscosity effect, and that as will be shown later this deficiency need not be regarded as a defect of the vortex theory, but as simply a result of the fact that the theory is not yet complete.

Even more important than the generally satisfactory result of comparing calculated with theoretical lift was the result of the calculation of pressure distribution and centre of pressure of the same wing and a comparison with the

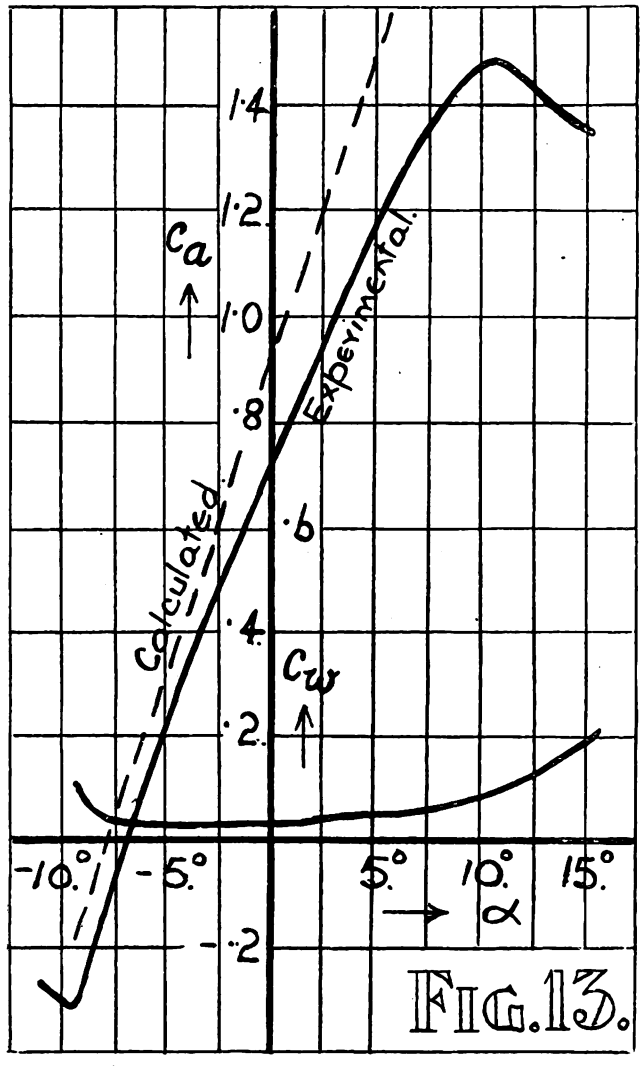

FIG. 13.

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measured pressures. The calculated pressures are everywhere higher than the observed ones—as follows from the fact that the calculated lift is greater than the observed lift, but the general similarity of the calculated and the observed curves of Fig. 14 is striking. Here again observed pressures are in full lines and calculated ones are in dots.

The wing of infinite span—or infinite aspect ratio—and its wind-tunnel equivalent are of scientific importance only, as representing a simplified case for calculation, and as a base on which the general theory of the real wing can be constructed.

The results mentioned above indicate that there is a general correspondence between theory and practice. In the light of these results it becomes a reasonable working hypothesis to assume that the lift of an aerofoil is in fact to be accounted for on the assumption that there is a circulatory flow round the wing.

This circulation in the real wing is always less than the theoretical circulation, which is what might reasonably be expected from the existence of considerable viscosity in the real fluid as against the negligible viscosity assumed for theoretical purposes.

Even for the wing of infinite aspect ratio therefore it is not possible to calculate what will be the actual circulation, or the actual lift.

But as a matter of fact the lift can fairly easily be measured, and the real circulation can be calculated from the lift—since the two are directly proportional one to another.

It is to this fact that the theory owes its real value, for as will hereafter be indicated deductions as to certain important effects of circulation and of the vortices which result therefrom depend on the value of the circulation and on the strength of the vortices only, and so long as a real value can be assigned to the circulation, the fact that this value differs from the theoretical value is unimportant.

Put in another way the incomplete theory says that at a given incidence a particular aerofoil ought to have a certain lift coefficient. In practice it develops that lift coefficient at a greater angle of incidence. Nevertheless the real wing, in certain respects, behaves very much as theory indicates it should behave at that lift-coefficient.

The Monoplane of Finite Span.

Passing from the wing of infinite span to the practical case of a wing which has a limited span it can be shown that a drag is set up which is due to the disturbing effect of the trailing vortices.

For the sake of simplicity the fact that a wing has chord as well as span is neglected and it is assumed that a wing may be represented as a lifting line round which there is a circulation of such strength as to provide the required lift. This simplification in fact leads to certain errors, but they are unimportant for wings of ordinary aspect ratios—in fact for aspect ratios as low as 3 experiment shows that a real wing behaves as an approximation to the lifting line sufficiently close for most practical purposes.

A wing of finite span together with its system of trailing vortices may be represented in its simplest form by the diagram of Fig. 15, where AB is the lifting line with its circulation and the two trailing vortices are indicated by the parallel lines.

This system viewed from in front is represented by Fig. 16, which shows roughly the motion in the vortices. It is obvious that everywhere between the cores of the two vortices there is a downward velocity and everywhere outside an upward one.

There are definite laws governing the distribution of velocity round the core, or centre of a vortex filament. The velocity is everywhere inversely proportional to the radius from the centre, and to the " strength " of the vortex—or the circulation is proportional to the product of velocity by radius—or more strictly—by circumference. It can be seen that this strength is constant and does not vary with the radius at which it is measured.

In the simplified case here considered it will be seen that the downward velocity anywhere between the two vortices can very simply be calculated.

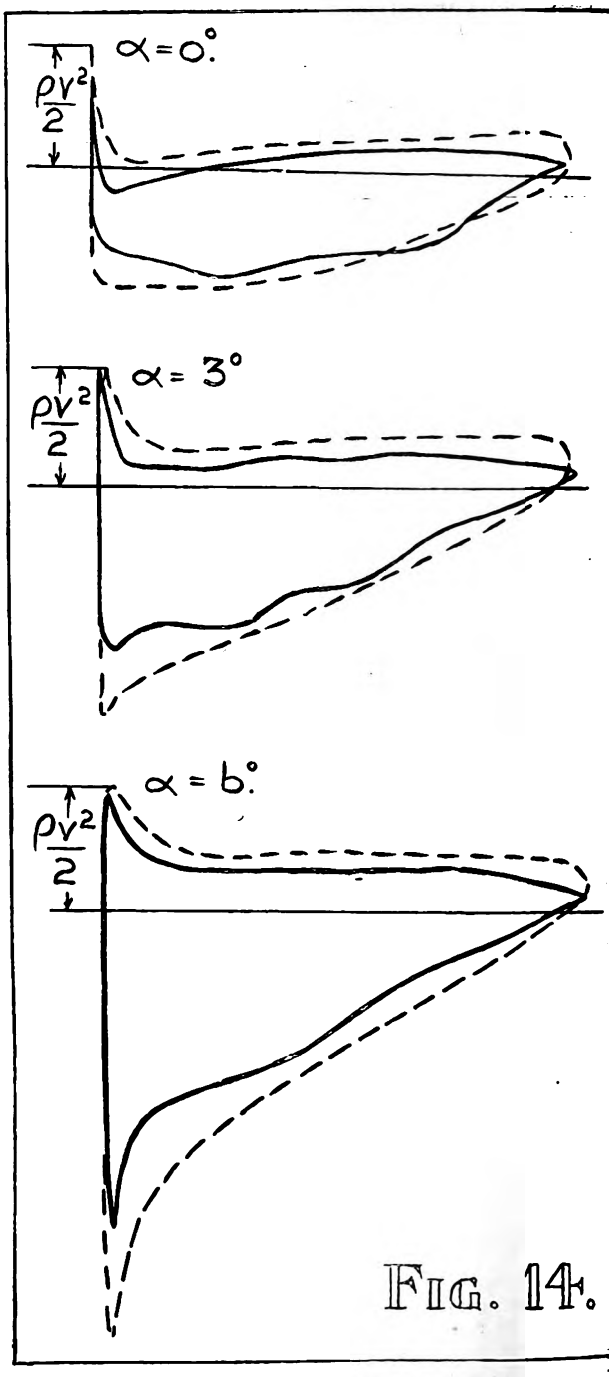

Fig. 14.

The strength of the vortex is the strength of the circulation round the wing, which is a measure of the lift. From the distance of any point from the core of a vortex the velocity due to that vortex for any value of lift is calculable and the total velocity is the sum of the velocities due to both vortices.

This downward velocity extends right up to the hypothetical lifting line, and it modifies the whole flow over the line by tilting the flow of the whole stream so that it has a downward velocity at the lifting line itself.

If now a wing of very small chord is substituted for the lifting line of hypothesis, the result is as shown in Fig. 17. A, top, represents the flow round the infinite wing where there is no down velocity due to vortices, because

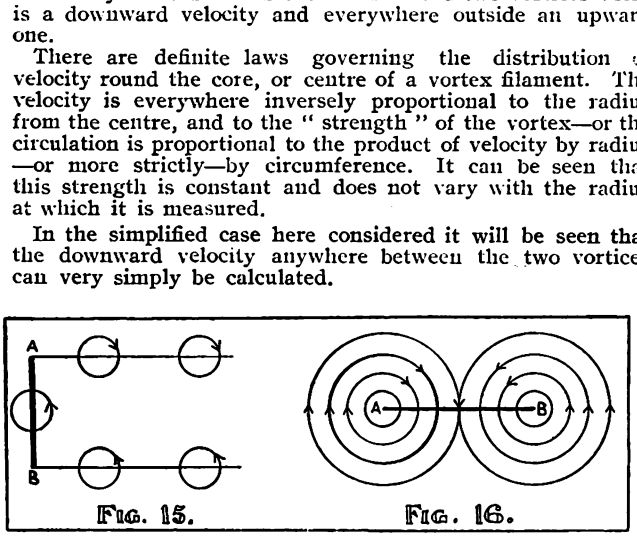

Fig. 15.

Fig. 16.

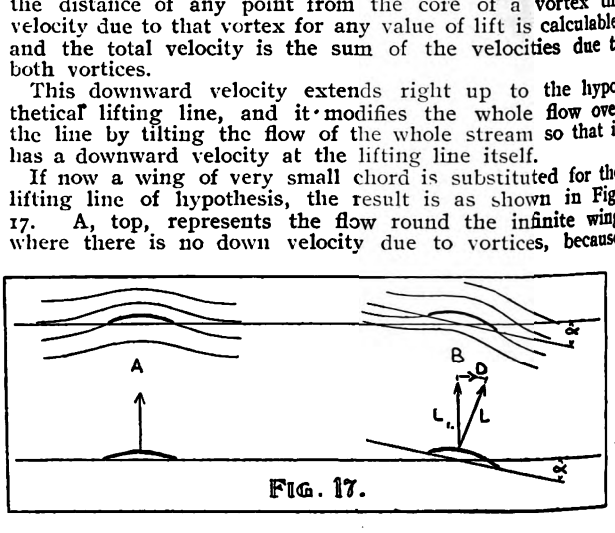

Fig. 17.

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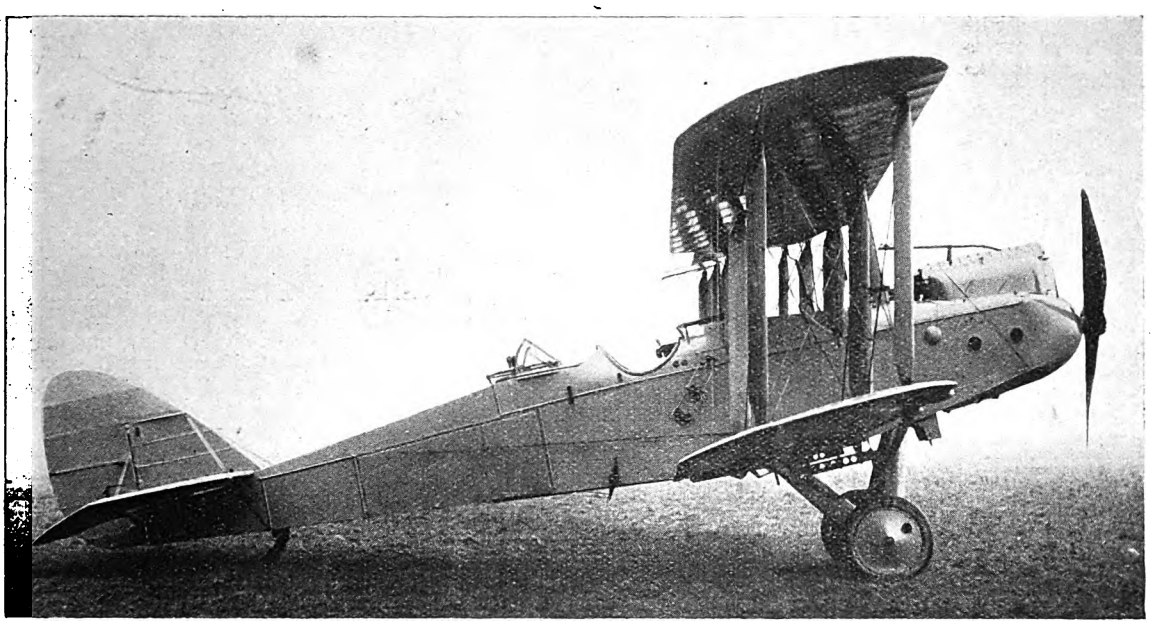
BRITISH ADC LIMITED AIRCRAFT.



D.H 9.—230 h.p. SIDDELEY "PUMA."

D.H.9b. ROLLS-ROYCE "EAGLE VIII."

The D.H.9 & D.H.9B (A.D.C. Modification) as shown above, are both examples of the thorough workmanship and extreme care which are characteristic of all reconditioning and modifications undertaken by the Aircraft Disposal Company, Ltd.

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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS

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the vortices are removed to an infinite distance. B represents the finite wing, which is producing the same lift per unit of span as the infinite wing A. The whole airflow system has been tilted through the angle α by the effect of the vortex velocities.

This would reduce the incidence of the wing and therefore the lift, and to restore the incidence and lift to the original values the wing itself must also be tilted through the angle α.

The lift force caused by the circulation is always at right angles to the general stream velocity at the wing. In the case A this force is therefore vertical and has no horizontal drag component. In case B of the finite wing, this force is also tilted back through the angle α, and it has therefore a horizontal component D, which is a drag, and a vertical component L_1 which is the available lift.

In practice this angle of tilt α is always a small angle and in consequence for all practical purposes L_1 may be taken as equal to L.

The drag which results from this tilting of the system is called the "induced drag" to differentiate it from such drag forces as result from viscosity.

Thus although the infinite span wing in a non-viscous fluid has no drag, any wing of finite span has a definite drag which has nothing whatever to do with the viscosity of real fluids—but must be additional to any resistance caused by friction in the fluid itself.

Also it is obvious from the argument as set out that this drag is greater the greater the strength of the circulation round the wings—that is the greater the lift per unit of span—and is also greater the smaller the distance between the cores of the trailing vortices—that is the smaller the span.

The system of vortices of Fig. 15 however does not represent any real case. The assumption of a single vortex running from each wing-tip involves the assumption that all the circulation is carried off at the tip and therefore that the circulation and consequently the lift is uniform along the span.

Actually the lift varies continuously, from the centre of the span to the tips, reaching zero at the tips themselves, and in consequence a sheet of vortices springs from the trailing edge over the whole span. This sheet as already described (Fig. 10) rolls up into a pair of main vortices behind the wing—but at the wing itself the velocity of down-wash is that caused by the sheet of vortices.

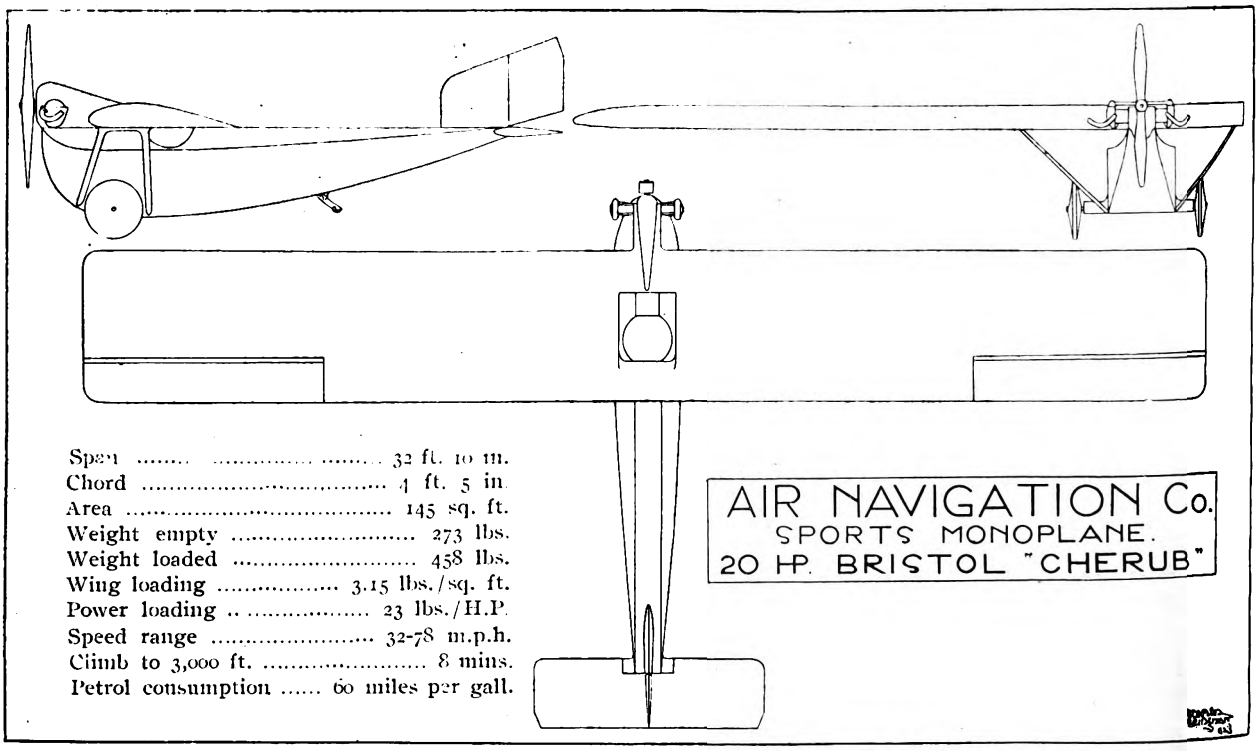
It is not possible to calculate what is the resulting angle of down-wash at the wing unless the exact distribution of vortices along the span is known. A good deal of trouble was expended in the effort to find an expression for this distribution of vortices which could be regarded as both possible, probable, and convenient for calculation purposes.

The vortex distribution along the span governs the distribution of circulation round the wing along the span, and therefore the distribution of lift along that span.

Finally it was found that a distribution of the lift such that the lift was everywhere proportional to the ordinates of a semi-ellipse with its major axis equal to the span gave satisfactory results.

(To be continued.)

A LOW-POWERED AEROPLANE.


Span ..... 32 ft. 10 in.
Chord ..... 4 ft. 5 in.
Area ..... 145 sq. ft.
Weight empty ..... 273 lbs.
Weight loaded ..... 458 lbs.
Wing loading ..... 3.15 lbs./sq. ft.
Power loading ..... 23 lbs./H.P.
Speed range ..... 32-78 m.p.h.
Climb to 3,000 ft. ..... 8 mins.
Petrol consumption ..... 60 miles per gall.
AIR NAVIGATION Co.
SPORTS MONOPLANE.
20 HP. BRISTOL "CHERUB"

The Air Navigation and Engineering Co. of Addlestone, near Weybridge, have designed and propose to build the little single-seater low-powered monoplane shown in the scale-drawings here reproduced.

The general idea underlying the design is that such a machine would meet not only a demand for a cheap aeroplane on the part of those who already know how to fly, but that it would serve a very useful purpose as a training machine. It would be intermediate between the glider and the normal aeroplane, yet very little more costly and no more dangerous than the glider.

The machine has a number of interesting features. It is a thick-wing monoplane, with two struts from the bottom of the fuselage on each side running out a very short way on each side. The wing is built on one single spar of triangular box section—as shown in a sketch. This type of spar has been proved by tests to be extremely efficient both as regards resisting bending and as against torsional stresses, which are extremely important in a machine such as this.

Another interesting feature is the shape of the fuselage. A tractor machine of this size is always difficult to arrange, because the pilot has to be behind the main part of the wing, and it is difficult to give him any reasonably good view. The narrowing down of the upper part of the fuselage, which is visible in the end elevation, allows him in this case to see forward at a small angle on each side of the centre line much as in the Peyret-Maneyrol glider.

The triangular spar also allows him to see upward at a reasonable angle.

The fuselage is of plywood construction, built on four longerons and a series of formers.

The under-carriage is very simple—and consists of a cantilever structure of two steel tubes projecting on each side of the fuselage between which the axle is rubber-sprung. The wheels are built up of wood and three-ply, with a laminated ash rim shod with a leather strip.

This type of wheel has been used in Germany for gliders, but the detailed design of the present wheels has been worked

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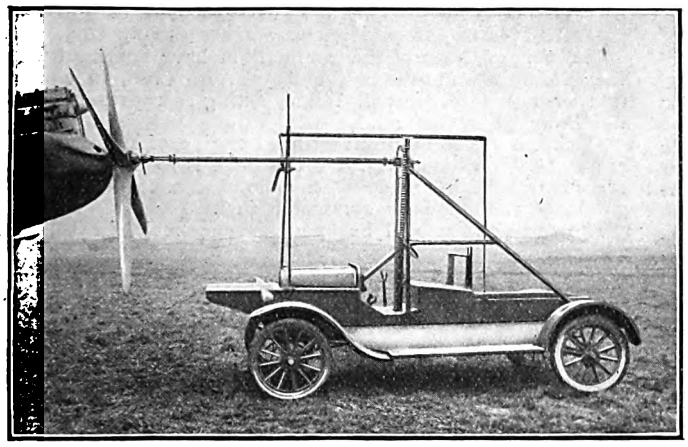

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Aircraft Engines

The "LYNX"
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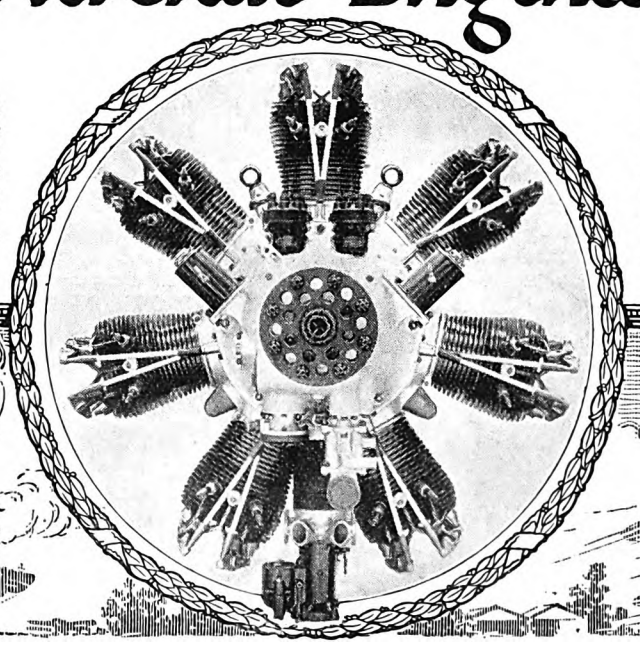
gives 175 h.p. at 1,700 revolutions. Its chief characteristics are low petrol and oil consumption and perfect cooling.



Latest Models:
150 h.p. 7 cyl. Armstrong Siddeley Radial.
300 h.p. 14 cyl. Armstrong Siddeley Radial.

ARMSTRONG SIDDELEY MOTORS LIMITED (allied with Sir W. G. Armstrong Whitworth and Co., Limited), HEAD OFFICE and WORKS: COVENTRY. *Telephone: Coventry 954. Telegrams: "Sidarm, Coventry."* LONDON: 10, OLD BOND ST., W.1. *Telephone: Gerrard 6438. Telegrams: "Armsidco, Piccy, London."*

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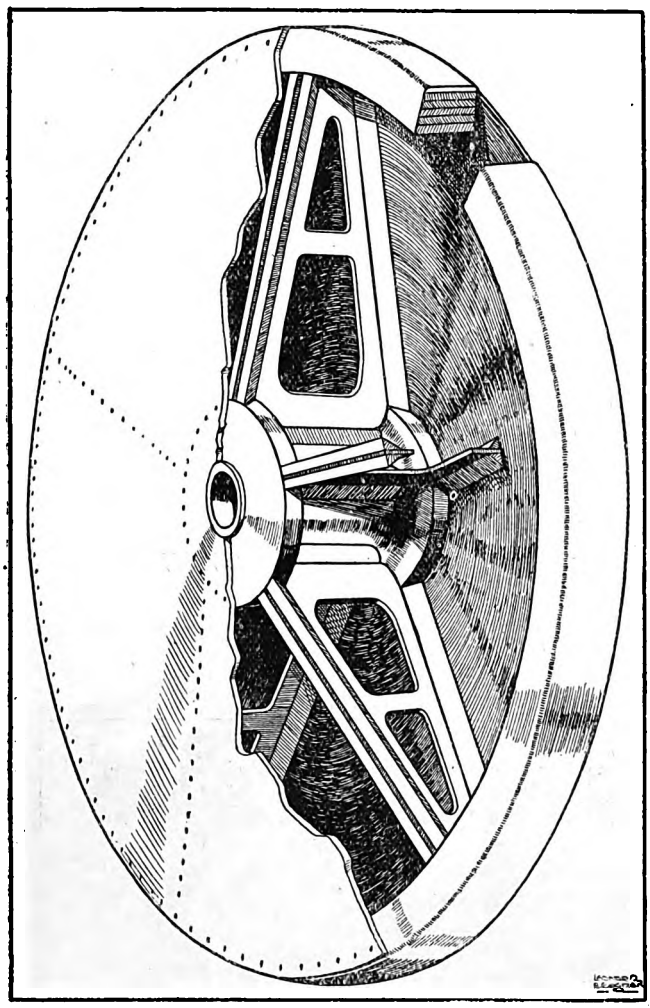
out very carefully and tests on samples proves that they are amply strong for the work they are intended to perform.

The machine is fitted with an entirely movable tail-plane—following in this respect glider practice, and it is probably true that for a machine of this size this arrangement has advantages.

The engine to be used is the new Bristol "Cherub" recently described.

It is claimed that model tests show that the complete machine will have a L/D ratio of 16.5 to 1, and that the performance estimated (see the specification on the scale drawing) can fairly easily be realised.

The machine will therefore be a real aeroplane with a distinctly high performance, and not a "minimum-power kite."



Part sectional view of the wooden wheels of the Air Navigation Co.'s low-power machine.

THE DUKE OF SUTHERLAND'S PRIZE.

It is announced that the Duke of Sutherland, Under-Secretary of State for Air, has offered a prize of £500 to be competed for by low-powered aeroplanes during this year.

The general lines of the competition have been settled by the Gliding Committee of the Royal Aero Club, in consultation with General Bagnall Wilde, acting as representative of the Duke of Sutherland.

Machines are to be fitted with an engine of not more than 750 c.c. cylinder capacity, and the prize is to be awarded for the longest flight made with a total consumption of one gallon of commercially obtainable fuel.

The competition will be open for one week, in the early autumn.

A TITANINE APPOINTMENT.

Mr. T. Standard Jones, B.Sc., A.I.C., late of the Air Ministry Inspection Laboratories, has taken up a position in the Research Department of Titanine Ltd., of 175 Piccadilly and Hendon.

ROLLS-ROYCE PROFITS.

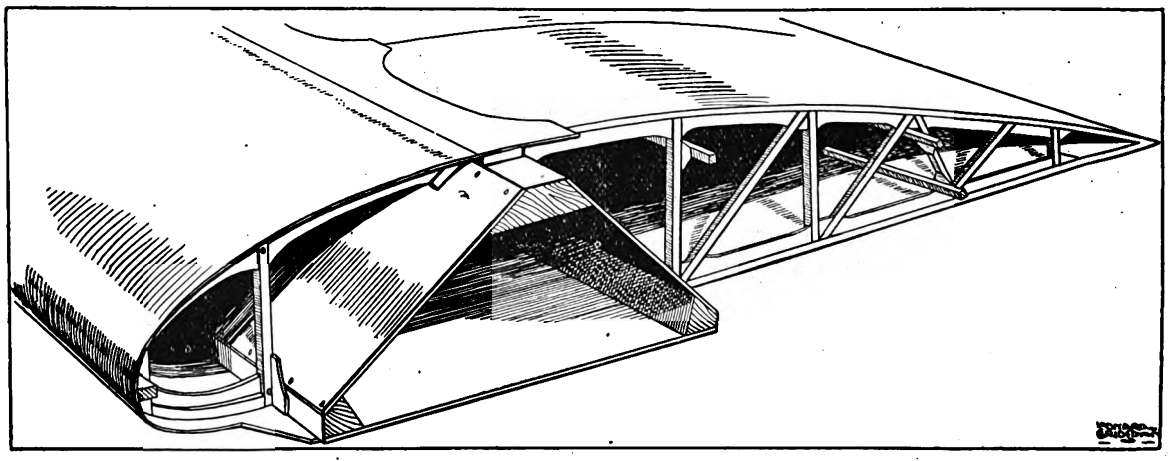
The Directors of Rolls-Royce Ltd. have issued their annual report. It shows that the profits for the year ending Oct. 31 last amounted to £149,208. At the annual meeting of shareholders, which was held at Derby on Mar. 29, they recommended that a dividend of 8 per cent. should be paid in respect of the year named.

NEW COMPANIES.

The British Marine Air Navigation Co. Ltd. was registered on Mar. 23 as a "private" company with a nominal capital of £15,000 in £1 shares. The objects are: To adopt agreements (1) with the Supermarine Aviation Works Ltd. (a) for them to supply three "Sea-Eagle" type Amphibian Flying Boats complete with engines, two spare engines, certain machine spares, seagoing tenders, and pontoons for embarking and disembarking, on similar terms as are already agreed between the Air Council and the said company, for the granting of a subsidy under the Civil Aviation Scheme, (b) that all aircraft shall be supplied to the company by or through them providing same are charged at fair and reasonable market prices and (c) that they shall be appointed consulting aeronautical engineers at a suitable remuneration to be settled by the Board and (2) with the Asiatic Petroleum Co. Ltd. for them to have the exclusive supply of all petrol and lubricating oils to the company providing same are charged at fair and reasonable market prices, and subject to the engine-makers approving of the brand of fuel and oil; and the Asiatic Co. will procure Shell-Mex Ltd. to make supplies under the above terms; to establish, maintain and operate an air service of seaworthy flying boats and flying-boat "Amphibian" aircraft between Southampton, Le Havre, Cherbourg and the Channel Islands, and lines of aerial, land and sea conveyances and craft, in such place or position, and between such places as may be selected by the company and on such terms as may be thought fit, etc.

The subscribers (each with one share) are:—H. Scott Paine, "Cliff," Weston, Hants, engineer; James Bird, Royal Thames Yacht Club, 80, Piccadilly, W., Squadron Commander, R.N. (retired). The subscribers are to appoint the first directors.

The Supermarine Aviation Works Ltd. and the Asiatic Petroleum Co. Ltd. whilst respectively holding 5,000 shares may each appoint a director. Qualification (except a nominated director) 1 share. Remuneration as fixed by the company. The registered office is at Elm Road, Woolston, Southampton. The file number is 188,715.



Sectional view of the wing of the Air Navigation Company's low-powered machine, showing the triangular box spar.

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R.A.F. INTELLIGENCE.

Appointments.

Air Ministry, Mar. 27.

General Duties Branch.—Wing/Cmdrs. E. R. C. Nanson, the rank of this officer is as now stated, not Group/Captain as stated in R.A.F. Bulletin dated Mar. 20; E. M. Murray, D.S.O., M.C., from No. 45 Sqdn., Iraq, to command No. 2 Wing H.Q., India, 2/3; J. C. Halahan, C.B.E., A.F.C., from H.Q., R.A.F., India, to command No. 3 Wing H.Q., India, 15/2; J. R. W. Smyth-Piggott, D.S.O., from R.A.F. Depot to command Armament and Gunnery School, 23/2; O. T. Boyd, O.B.E., M.C., A.F.C., from No. 24 Sqdn. to command School of Army Co-operation, 15/2 (substituted for the notification concerning this officer dated Mar. 20).

S/Ldrs. C. C. Durston, from R.A.F. Depot to School of Army Co-operation, 16/3; A. G. R Garrod, M.C., D.F.C., from School of Army Co-operation to R.A.F. Staff College, 3/4.

F/Lts. W. A. Harvey, from Boys' Wing, Cranwell, to I.A.A.D., 23/3; E. O. Grenfell, M.C., A.F.C., from No. 27 Sqdn., India, to No. 1 Sqdn., Iraq, for duty as Adjutant, 3/2; J. L. Vachell, M.C., from No. 27 Sqdn., India, to No. 3 Wing H.Q., India, for duty as Adjutant, 15/2; R. A. de H. Haig, from Aeroplane Exp. Estab. to command Experimental Section, R.A.E., 23/4; E. C. Emmett, M.C., D.F.C., from No. 39 Sqdn. to R.A.F. Depot (Supernumerary), 1/4; L. F. L. Bawn, from I.A.A.D. to Boys' Wing, Cranwell, 9/4; A. M. Moffatt, from Armament and Gunnery School to H.Q., C..A. (Supernumerary), 4/4; E. R. Whitehouse, from No. 1 School of T.T. (Boys), Halton, to No. 2 F.T.S., 9/4; P E. Maitland, A.F.C., from No. 4 F.T.S., M.E., to No. 45 Sqdn., Iraq, 23/1; P. J. Barnett, M.C., from R.A.F. Depot to No. 39 Sqdn., for duty as Adjutant, 26/3; V A. Albrecht, O.B.E., M.C., from No. 4 F.T.S., M.E., to C.F.S. (Supernumerary), 1/4.

Medical Branch.—F/Lts F. J. Murphy, M.C., from Engine Repair Depot, M.E., to No. 4 F.T.S., M.E., from duty as Medical Officer, to remain attached to Stores Depot, Egypt, 16/2, V R. Smith, from H.Q., R.A.F., Middle East, to Engine Repair Depot, M.E., 12/2; W. G. L. Wambeek, from No. 20 Sqdn., India, to Aircraft Depot, India, 17/2; F. T. Allen, from No. 2 F.T.S. to R.A.F. Depot, 12/4; R. H. Wace, M.B., from No. 1 School of T.T. (Boys), Halton, to Central Medical, 6/4; H. E. H. Tracy, from Research Laboratory and M.O.S. of I. to No. 1 School of T.T. (Boys), Halton, 6/4.

Stores List.—S/Ldr. A. Burtenshaw, O.B.E., M.C., to command Central Supply Depot, Iraq, on appointment to Short Service Commission in Stores Branch.

F/Lts. W. C. Clark, from R.A F. Depot to School of T.T. (Men), 19/3; E. Bennett, from No. 1 Stores Depot to No. 1 School of T.T. (Boys), Halton, 20/3.

Accountant Officers.—S/Ldr H. F. Fuller, from I.A.A.D. to H.Q., R.A F., Cranwell, 13/3.

F/Lt. R. Whyte, from School of T.T. (Men) to No. 1 School of T.T. (Boys), Halton, 18/3.

Col. Wilkinson Dent, C.B.E., D.S.O. (Indian Army) to Iraq Comman. on attachment to R.A.F for two years, 1/10.

Capt. (Brevet Major) C. N. Tippetts (S.W.B.) to H.Q., Iraq Command, on attachment to R.A.F. for two years, 9/2.

From "*The London Gazette.*"

Air Ministry, Mar. 20.—F/O. J. S. Chick, M.C., is granted a permanent commission in the rank stated (Oct. 24/1919); F/O. W. B. J. Humphrey relinquishes his short service commission on account of ill-health (Mar. 21).

Mar. 23.—His Majesty the King has directed that the award of the Distinguished Flying Cross to F/O. M. J. Langley, R.A.F., which was gazetted on Dec. 22, 1919, shall be cancelled and his name erased from the Register in consequence of his having been removed from the R.A.F.

Mar. 27.—F/Lt. A. S. C. Maclaren, O.B.E., M.C., D.F.C., A.F.C., is granted a permanent commission in the rank stated (Sept. 9, 1920) (since promoted); F/O. G. L. Carter is granted a permanent commission in the rank stated (Jan. 20/1920); F/O. W. F. McManus relinquishes his short service commission on account of ill-health and is permitted to retain the rank of Lt. (Mar. 28).

The Indian Army.

The *Times* correspondent in Delhi in a telegram dated Mar. 8 states that there are 40 vacancies in the R.A.F. for surplus officers of the Indian Army. They will be seconded for four years, after which period 20 officers will be eligible for permanent commissions in the R.A.F. and 20 for reabsorption in the Indian Army. If reabsorption is not possible these officers will be entitled to retirement under the surplus scheme of benefits. The first year's training will be in Egypt and England.

Officers already retired as surplus are eligible; if they are selected, gratuities will be refundable by instalments. [In this connection it is of interest to note that axed Naval Officers who are accepted for short service commissions in the R.A.F., with the possibility of acquiring permanent commissions, are not required to refund their Naval gratuities. It is not explained why Naval applicants should have preference over Indian Army officers, who on the average are of a distinctly superior type.—C. G. G.]

46 Squadron Re-union.

One of the few squadrons which still continue to hold its reunion dinner each year is No. 46, and on Mar. 24, Boatrace Night, twenty members of that squadron and four guests assembled at the Hotel Cecil for a thoroughly enjoyable evening. Among those present were S/Ls. Babington and Robeson, the Rev. Mr. Ensell, F/Lts. Lee and Sanderson, and masquerading as civilians, Dimmock, Marchant, Shadwell, Williams, Hughes, Courtneidge, Quilter, Jenkins, Quick, De Watteville, Gribbon, Meredyth-Davis, Smallman, Taylor and Debenham.

Marchant's energy is primarily responsible for this welcome reunion taking place each year, but something must also be said for the splendid spirit of the squadron, especially when it is considered that some of the above come from longish distances—one from France, others from Somerset, Devon, Thanet, Cambridge and so on. A word to those who intend to be there at next year's dinner—bring your squadron photograph albums with you.—"L."

THE R.A.F. SPORTS BULLETIN.

(Published in Collaboration with the R.A.F. Sports Board.)

The Individual Boxing Championships.

The R.A.F. Individual Boxing Championships will be held in the Gymnasium at the School of Technical Training, R.A.F., Halton, on April 18 and 19. Entries are unlimited.

Officers at following weights:—Heavy. Middle, Welter, Light and Feather. Entrance fee 5s. each.

Airmen—all weights.

Entries, together with officers' entrance fees, should be sent to the Honorary Secretary, R.A.F. Boxing Association, R.A.F. Depot, Uxbridge, before April 11.

Tickets may be obtained from the Honorary Secretary. Prices of admission:—1st day. Afternoon: 2s. 6d., 1s., and 6d. Evening: 3s., 2s., and 1s. 2nd day (Finals): 4s., 2s., and 1s. Tickets available for all sessions of the meeting:—6s. 6d., 3s. 6d., and 1s. 6d.

The Lawn Tennis Association.

A full meeting of the Association Committee was recently held to receive the report on the past year and to approve the accounts. The Chairman (Air Cmdre. F. C. Halahan, C.M.G., D.S.O., M.V.O.) reported that the year had been a satisfactory one in every way. The entries for the Championship had been excellent, 66 players entering for the singles and 27 pairs for the doubles. Also in the inter-services championships the Air Force had secured second place with 6 points, the Army winning for the third year in succession with 9 points. Tennis was on the increase and he was glad to report that the game was becoming more and more popular among the men, so much so that it had been decided to include an event for airmen at the next Inland Area Tournament at Uxbridge.

It was also decided that a veterans' event open to serving and retired officers over the age of 40, should be included in the Annual Championships which will again be held at Queen's Club, between July 16 and 21 inclusive, previous to the inter-services Championship on July 22.

The financial position has continued to improve and as the Association was now soundly established it was decided that the travelling expenses of officers representing the Air Force in matches should be paid, but in view of this the Committee were of the opinion for this year at least that no reduction should be made in the entrance fees for the championships.

The following representative matches have been arranged:—June 2 Roehampton at Roehampton; June 9 Queen's Club at Queen's Club; June 22 Staff College at Camberley; July 7 London County Club at Hendon; July 28 Stock Exchange at Wimbledon.

Squash Racquets.

In a squash racquet tournament recently held at Kenley between Inland Area H.Q. and No. 1 Group H.Q., the Area proved successful by 3 matches to 2. Results:—Air/Cmdre. Dowding bt. Air/Cmdre. Gerrard (2—1), S/Ldr. Robinson bt. S/Ldr. Archer (2—0), F/Lt. Stammers bt. F/Lt. Haslam (2—0), F/O. Carr lost to S/Ldr. Adeley (0—2), and F/O. Green lost to F/O. Baker (1—2).

Armament and Gunnery School, Eastchurch.

Association Football.—The team of the Armament and Gunnery School has this year had a very successful season. By good fortune drafting has only removed a few of the better players and there have been sufficient airmen left on the Station who were good enough to be welded into the team. From the beginning of the season the moral of the team has slowly improved. The noticeable feature has been the growing unselfishness, and the realisation that if handshaking is indulged in and the half-back beats three opponents and passes to the inside right, that it was the half-back really who scored the goal, and not the other man who was given the actual chance. Apart from one tragic patch of "temperament" from which the team soon completely recovered, there have been few defects this season.

The replay against the Reserve Fleet at Sheerness, for the cup presented by Mrs. Honeyball, was a really good game The original game was quite good and resulted in a draw,

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2—2. But on meeting again the Air Force team had a very different set of opponents. For sheer size and speed and extra touches of really clever football the Navy team, having drawn on large reserves, looked unbeatable. A Naval supporter honestly confessed after the game that there was just an element of luck in their goal. However the Air Force team took their beating in the right spirit.

The game against Isle of Grain in the R.A.F. Association Cup proved a very easy win for Eastchurch by 4 goals to 1. For the next round in this cup our opponents were R.A.F., Manston, and the result was a great victory for Eastchurch by 2 goals to nil. It was a great victory, because the team as a whole had realised some hours before the game that by pulling their whole weight for the team they were good enough to beat anybody.

Ferguson as captain has proved a half-back of very real merit. Blank in the half-back line has been very reliable and the two backs have invariably shown unremitting zeal in tackling their opponents. The force of the attack has been most frequently delivered from the right wing with Goodman as outside and Attwood as inside right, and their play together has been of a very high standard. In fact the whole team has been one of good workers, never shirking a hard tackle, but they must learn to mark their men quickly at a throw-in from touch.

The R.A.F. Rugby Cup.

(Unofficial.)

The final for the R.A.F. Rugby Cup was played at Richmond on Mar. 28 between No. 1 F.T.S., Netheravon, and No. 2 F.T.S. Duxford. Netheravon won a fast and hard if not very scientific game by one goal and two tries to one goal.

Owing to a slight attack of "temperament" on the part of the Editorial Talbot one missed the first twenty minutes of the game but one gathered from a supporter of Netheravon that the score was then 8 points to 5, AC. Miller having scored an unconverted try for Netheravon, P/O. Flint the Duxford scrum-half a good solo try which was converted by Sjt. Ridge, and Netheravon a further goal from a try by F/O. Adams.

It was pretty obvious by this time that Netheravon were having their own way in the scrum and if their heeling out and breaking up had been a bit smarter they might have put up a bigger score. But as it was, their footwork and brute-force methods in the loose were better than those of the R.A.F. team itself. They got the ball among their feet and carried it along regardless of their backs.

Duxford were weak in the scrum but showed distinctly more finish behind the scrum. Their halves worked hard and seized what opportunities there were, especially F/O. Trench who never lost a chance, and their three-quarter line was distinctly brilliant at times.

In the second half Duxford had the wind with them and they put up a magnificent fight. Their passing was good but they were slow to follow up and were driven back again and again by the sure touch-finding of the Netheravon full-back F/Lt. Fenwick, who was very good indeed

The Netheravon forwards splendidly led by F/Lt. Usher kept up their attack and scored another try, AC. Gordon going over.

The teams were:—Netheravon: F/Lt. W. L. Fenwick; AC. Gordon, L/AC. Snaith, F/O. F. Marson, and F/Lt. D. S. Earp; F/O. T. Rose and AC. Miller; F/Lt. R. H. O. Usher, F/Lt. C. H. H. James, F/Lt. A. Lees, F/O. C. D. Adams, Sjt. Shepherd, P/O. B. V. Reynolds, Cpl Grosse and Cpl. Hordley.

Duxford: F/O. Graham; F/O. MacLellan, Sjt. Ridge, P/O. Coope and F/O. Coffin; P/O. Flint and F/O. Trench; F Isaac, F/O. Mansfield, F/O. Harcourt Vernon, F/O. C. E. H. Allen, O/O. Hesketh, F/Lt. Lang, P/O. Mason and AC.2 Black.

The game was watched by about 600 enthusiastic supporters chiefly "Other ranks" from the two stations concerned. Unfortunately a good proportion of the spectators were well over the touchline owing to the fact that there were no ropes and nobody capable of keeping them off the field of play. This omission did a good deal to spoil the match both for the players and supporters and somebody should be quietly but effectively crucified for it.

After the match the cup was presented to F/Lt. Usher, captain of the Netheravon team, by Air-Vice-Marshal Sir W. G. Salmond who congratulated the team and referred, amid terrific applause, to the great achievement of the R.A.F. in winning the Services Championship.—C. M. McA.

ESPRIT DE CORPS.

["The Spirit of Air Force Discipline" by Flight-Lieut. A. S. G. Lee, M.C., Royal Air Force. 29 pp. 9d. net. Gale and Polden.]

This very admirable little book by F/Lt. Lee has just been published by Messrs. Gale and Polden and is one believes the very first of its kind. It aims at helping officers when giving "talks"—for they are not really set lectures—on that vital element of leadership namely "Discipline" in particular to new recruit airmen of the Service.

Its seven chapters are very well planned and its obviously practical help will come as a boon to those officers who can appreciate the value of its contents. The detail work is of a high order and many of its points should impress themselves indelibly on both the officer and the recruit.

One cannot help feeling somehow that the writer might have done so much more than he has. Let us hope he will be spurred by this kindly-meant criticism to produce a second edition, costing say 1s., at a very early date. On the very sound principle that where a grown-up wishes to interest a small child seriously the talk of "Diddums" etc. is always eschewed and an attempt is made to talk to the child just as to another grown-up, so one feels that the writer might have dilated on those wonderful fighting phrases "*Moral*" and "*Esprit de Corps*" more than he has done. For Discipline is the foundation of both.

It is quite definitely a fact that in the Royal Air Force it is perfectly simple to run a flight in peace time on exactly the same lines as on active service. "*Moral*" can be cultivated among the airmen every day and in their every act. An airman of high moral does his job so conscientiously during peace time that a mere declaration of war to him simply means that probably he will have to work a little harder. Moral can be demonstrated when the plugs have to be cleaned or when a machine has to be inspected. The Napoleonic dictum that the power of the moral to the physical is as three is to one can in the Royal Air Force be applied in the element of the Service where *prima facie* Moral is not a dominant fact.

On the subject of *Esprit de Corps*,—just recently two very big things have happened to the Royal Air Force which have done a vital amount of good to the esprit de corps of the Service, namely the defeat of both the Navy and the Army at Rugger. One feels that the writer might in a future edition make very much indeed of not necessarily the recording of these two very great victories but the effect of them on all ranks in raising moral.

It is inevitable that in years to come the Esprit de Corps of the Royal Air Force must be finer than that of the Army or the Navy. The reason is that in the Army the esprit de corps is invariably for the Regiment or Corps—not for the Army as a whole. The average infantryman is not overwhelmed with joy if a company of Army Service Corps wins the Rugger Cup of the Army. Whereas the airman is really full out for the Air Force when the Army is beaten. And manifestly in the Navy esprit de corps must tend to suffer when personnel are axed from all ranks just because they are not wanted. Naval esprit de corps is almost always for the ship. The Esprit de Corps of the Air Force is primarily for the Service and secondly for the station. At any rate that is what most of us are striving to cultivate.

One would have loved to have seen an allusion in his chapter on Drill and Discipline to the famous Stalky of Kipling fame. The exact words are,—"Stalky came under the spell of ordered movement." Which seems to be the crowning why and wherefore of Drill. An irksome task which can become a real joy.

The chapter on "Camp Duties" is thoroughly well done and should help airmen to understand a little more than they do of the exact connection between Discipline and Comfort.

Altogether F/Lt. Lee is to be congratulated on a really well-thought little book, which should be in the hands of all officers for their own sakes as much as for the good of their men.—G. F.

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.
ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 14; Tuesday, 16; Wednesday, 15; Thursday, 17; Friday, 9; Saturday, 14; Sunday, 0.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 12*, passengers 115; Air Union, machines 24†, passengers 96; Total machines 36, passengers 211.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 18*, passengers 61.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 19, passengers, Manchester-London, 27, London-Amsterdam, 42.

LONDON—ROTTERDAM:

K.L.M., machines 11, passengers 29.

SPECIAL MACHINES, ROTTERDAM—LONDON:

De Havilland Aircraft Co., Ltd., machines 1, passengers 1.

Total number of trips by British machines: 50, carrying 246 pas. Foreign machines; 35, carrying 125 pas.

STATISTICS.

For week ending April 1:—

Machines, 85; Passengers, 371; Crews, 156; Total Personnel, 527.

Corresponding week last year:—

Machines, 66; Passengers, 177; Crews, 105; Total Personnel, 282.

Corresponding week, 1921:—

Machines, 48; Passengers, 162; Crews, 60; Total Personnel, 222.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

The number of passengers carried by the air lines during the past week was easily a record for this time of the year. The total exceeded 350 of which 211 were on the Paris route, Handley Page Transport carrying 115 and the Air Union 96.

A certain amount of the traffic was composed of Easter Holiday makers but throughout the week there has been a steady stream of passengers, all of which indicates that the summer rush has started.

Moreover if the traffic increases in its usual proportions, in the height of summer the totals will be enormous. The pity of it is that owing to the lack of British machines—there are not more than 20 running on all the lines—the bulk of the traffic will have to go to the foreign lines unless the British firms are all able to run their machines on the intensive and commercially sound Daimler basis.

Mr. MacIntosh on the Handley Page W.8b on Thursday last flew to Paris in 2 hours 24 minutes with 14 passengers, including Sir "Fritz" and Lady Ponsonby, who evidently believe their son's preachings, in addition to the wireless operator.

All the W.8bs are being converted to carry 14 passengers, so that running two machines per day in each direction H.P.T. will be able to deal with 392 passengers per week.

Mr. Hinchliffe who has been unwell lately resumed flying again on the Daimler Airway last Saturday and Mr. Frank Courtney has been flying on that service during the week.

Mr. Game has left the Instone Air Line to take up an appointment elsewhere. Mr. Game has been employed at the aerodrome since its inception in one capacity or another and he will be very much missed. All will wish him success in his new walk.

Mr. Larry Carter terminated his appointment with Handley Page Transport on Saturday and has now joined the Gloucestershire Aircraft Company.

Mr. Davis who has been a C.A.T.O. at Lympne and Croydon for the past three years also left on Saturday. He is going up as an undergrad. to B.N.C. at a university called Oxford which is well known as the place against which Cambridge rows annually.

Mr. Muir and Mr. Youell have returned from Spain and have been busy carrying joy-riders throughout the week-end.

Capt. Rex Stocken, for the Aircraft Disposal Company, was testing a Renault Avro during the week.—G. D.

"Te Perrinum Laudamus."

The Nation's thanks are due to the Royal Aero Club for the gloriously fine weather of the week-end. The Club had considered holding an Air Race meeting at Croydon on Easter Monday but they finally decided that as Easter was so early the weather would be too cold for spectators to turn out and watch the flying, it being much more suitable for "aero-golfing" and motor-mongering.

The weather that attends the Club meetings at Croydon is notorious for its vileness and one has little doubt that, had such a meeting been held, the clerk of the weather would have turned on snow and hail. So in spite of the lack of flying the world's workers were enabled to bask in the sun and several hard-worked pilots were able to take a well-earned rest.—G. D.

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ON THE AIRCRAFT TRADE AND AIR POLICY.

The Status of the Aircraft Industry.

For a number of years, in season and out of season, all sorts of people from peers of the Realm down to the editor of THE AEROPLANE have preached the doctrine that the effectiveness of our air Service and consequently the safety of the British Empire depends ultimately on the existence of a strong, efficient and firmly established Aircraft Industry capable of supplying to our aviators the best aircraft in the World.

The dissenters from this doctrine in the past were a few Army officers and a number of employees under the War Office who agreed with the late Sir David Henderson, then in control of Military Aeronautics, and with Colonel Seeley, then Under-Secretary for War, that the right way to maintain our air power was to equip the Royal Flying Corps with standardised aeroplanes produced like sausages by what they considered (entirely without reason or proof) to be "the best brains in the country" at the Royal Aircraft Factory at Farnborough. The dissenters to-day appear to be one or two Labour Members of Parliament who because of sheer ignorance or because of Communistic tendencies think (as one of them said in the Commons recently) that privately-owned firms should not be allowed to make weapons of war and that the manufacture of such necessities to our existence should again be relegated to the Royal Aircraft Factory now renamed the Royal Aircraft Establishment.

The fallacy in the belief of the early dissenters was disclosed early in the War when at the end of 1915 and early in 1916 our precious standardised B.E. biplanes were shot down by the dozen by German pilots on the highly individual products of our old friend Mijnheer Antony Fokker. The henchmen of the Royal Aircraft Factory and of Sir David Henderson professed to scoff at the "Fokker Scourge"—as one called it in this paper—and sundry well-meant efforts were made to lodge one's humble self in gaol, or alternatively into the Army as a C.III. batman. But truth somehow prevailed according to its habit and the famous Government Air Enquiry of the middle of 1916 broke the power of the Royal Aircraft Factory gang, with the result that the doctrine of the Necessity for a Strong Aircraft Industry was accepted officially.

The consequence was that thanks to the ingenuity and industry of the British Aircraft Constructors when left comparatively free from official interference the Royal Flying Corps had by the end of 1917 won the command of the air in all war areas. And they held it till the end of the war because they had unquestionably the best aeroplanes in the World as well as the best personnel and equipment.

Everybody in the Royal Air Force and in the Air Ministry to-day who has had any experience of war flying believes firmly that we can only get the best machines and engines and other equipment by giving the Aircraft Trade a perfectly free hand to experiment and produce what is wanted for war flying. They know that the way to get the best is to go to the Trade and say simply that they want an engine of such and such weight and horsepower to fit into such and such dimensions, or that they want an aeroplane to carry such and such a load at such and such a speed for such and such a distance, and that in due time they will get it. And they know that the Royal Aircraft Factory (or Establishment) has been experimenting for thirteen or fourteen years at a cost of many millions of pounds and has produced precisely nothing of any real value to aeronautical progress, though to give it its due it has produced quite a lot of interesting and amusing little gadgets and has discovered some rather interesting facts which have confirmed other people's ideas if they have not actually pointed the way towards a new epoch in aviation.

Therefore on the whole it may be taken that the doctrine of the Necessity for a Strong Aircraft Industry is fairly well established and that consequently the point of view of the Aircraft Trade itself is rather worthy of consideration by those in high places, not only at the Air Ministry but in the political circles which ultimately govern the fate of Ministries. Consequently one has taken some trouble to discover what the Trade thinks about the present state of British Aviation, Service and Civil, and one proposes to set forth here the impressions which one has gathered.

Strictly Unofficial Views.

First of all it must be clearly understood that what one says is not the official opinion of the Society of British Aircraft Constructors. On many points the official views of the S.B.A.C. as such differ materially from the views of individual members of the Society, as should be the case in a Society which is composed almost entirely of clever and in many cases brilliant men who have built up big businesses of thier own initiative and have made great steps in scientific progress through sheer originality of thought. Men of that stamp are not prone to the sheep-like habit of thought which pervades older and less adventurous trades.

What one will endeavour to convey is rather a collection of different views on subjects of common interest than the collective view of the Aircraft Trade on these subjects. One has endeavoured so far as possible to set down these views impartially although one confesses to having reached that extreme stage of old age of which it has been said that one has ceased to have beliefs and has merely acquired prejudices.

There are three questions which are at present exercising the minds of the Aircraft Trade. First there is the matter of the relation of the Royal Air Force to the Navy. Secondly there is the matter of Supply and Research. And thirdly there is the matter of Civil Aviation. One proposes to deal with these in that order.

The R.A.F. and the Navy.

When one comes to consider the attitude of the Trade to the much-vexed question of whether the Navy should have its own Air Service one meets a marvellous array of warring interests, factions and opinions. Memories of the early days of the War 1914-18 have left in the minds of many people in the Trade a distinct affection for the Navy. They recall that in the days to which one has already referred when the Royal Aircraft Factory gang was trying to crush the Trade and to get all the designing and experimental work to itself (with the consequent credit, honours, pay and promotion) the Air Department at the Admiralty under Commodore Murray Sueter, R.N.—now, alas, a mere M.P.—assisted by a little group of clever if occasionally eccentric Naval Officers kept the Trade alive.

The War Office ordered standardised aeroplanes which were obsolete before they ever went on active service. The Admiralty bought all sorts of queer machines, anything in fact that looked like putting up a better performance than those which already existed. Most of them went on active service before even their drawings were completed—let alone waiting till their production was standardised.

Justifiable Affection.

The result was that when the Fokker Scourge had very nearly broken the moral of the R.F.C. the Royal Naval Air Service saved the situation by handing over to the Army enough Sopwith "one-and-a-half-strutters" to equip several squadrons and by lending to the Army other squadrons complete with personnel on "Pups" and "Camels" which swept the Germans out of the air at the crucial moments of the Battle of the Somme and elsewhere. And the R.N.A.S. developed at Dunkerque (initially through the efforts of Squadron-Commander Spenser Grey) those remarkable bombing squadrons on twin-engined Handley Pages which by consistently attacking the German aerodromes in Belgium minimised the effects of the raids on London and on the Northern French ports and depots.

For every one useful type of machine acquired by Commodore Sueter's department about a dozen perfectly crazy experimental things were built, for his department included among its clever members some of the most amiable, amazing, and amusing lunatics whom one has ever had the joy of meeting. Ask any old-timer of the R.N.A.S. about the "No. 1,000" and the "Sparrow" and the "Push-prodge" and wonderful tales will be forthcoming. But the facts remain that the Navy kept the Trade alive and that the Navy was responsible for *all aeronautical progress* up to 1916.

Also the Navy's slap-dash and inefficient and wasteful but effective methods made it much easier for the young and

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inexperienced but brilliantly clever people in the Aircraft Trade to deal with the Navy than with the Army and its cut-and-dried Staff work and its multitudinous forms and formulæ. It was only when the little one-man-shows which built aeroplanes in sheds grew into vast factories with cost-clerks and order-clerks and checking-clerks and commissionaires and whatnots that the proprietors began to see the necessity for War Office forms in duodecimplicate (or whatever may be the right word for twelve-at-a-time) and began to see the muddle which arose from the Navy's habit of giving official orders on the backs of *billets-doux* confirmations of which generally failed to arrive.

On the whole therefore it is not very surprising that a good many people in the Trade have a certain tenderness towards the Navy and are not absolutely convinced that a Naval Air Service would be a bad thing. This is a point which the Air Ministry would do well to consider carefully, especially in relation to the dealings of its little sub-departmental demi-gods with people in the Trade.

One has frequently drawn attention to the way in which people in sub-departments on the technical side—people without any real experience of design or construction—seek to impose their wills on men in the Trade who do know how things ought to be done. There was the old scandal of the steel-construction experiments. There has been trouble and colossal waste of money over radiators and electrical equipment. There was and is constant delay and argument over comic calculations of stresses and strains in aeroplane structures. All these petty officials in the past and present have tended to alienate the affection of the Trade and to give it a bias in favour of the free and easy Naval methods.

Political Doubts.

Moreover the Trade (or some of it) is by no means sure that the Air Ministry is going to come out on top in its fight with the Admiralty and so there is a tendency in some quarters to make friends with the Mammon of Unrighteousness just in case the Admiralty wins. There is quite a reasonable fear that if the Admiralty does have its way and if the Trade to-day shows any hostility to the Admiralty the Trade may find itself without Admiralty orders owing to the Navy adopting a dockyard policy and building its own machines at Felixstowe or Farnborough.

If that happened it would of course result in the Navy getting a lot of very bad seaplanes at great cost in a very long time, because obviously the Trade could build better and cheaper machines just as the free firms on the Tyne and the Clyde and at Barrow build better and cheaper warships than are built in the dockyards at Chatham or Portsmouth or Devonport at such vast expense and with such long delays. But in the meantime the Trade would miss these orders : and what it wants is orders.

Single-Line Supply.

There is also the point of view that if the Admiralty set up its own Naval Air Service it would be bound to have its own Technical Department. In which case the Trade would be able to play off the R.A.F. technical people against the Navy technical people. And competition of that particular kind is very good indeed for trade.

During the War 1914-18 if an R.F.C. technical expert turned down an invention or a design it was only necessary to go to the R.N.A.S. and say "Look here, that fool of an opposite number of yours in the R.F.C. has turned down my perfectly good invention. I know you are intelligent and will appreciate it." The natural result was that the R.N.A.S expert did at any rate give the thing a fair trial, and if there was any good in it the thing was adopted so that the R.N.A.S. could say, "We've shown 'em how!" And the wangle worked equally well the other way round. If that system had existed till to-day we should have been years ahead with such things as steel construction, steel air-screws, engines, slow-flying, turn-indicators, and numbers of other things.

To-day with a single department of Supply and Research it takes much longer to get a good new idea adopted for though the owner of the idea may start it along several routes—either through the Active Service branch or the Research branch or the Inspection branch or the Civil Aviation branch or the Political branch or the Finance branch—it always comes in the end to the bottle-neck, the Technical sub-department concerned with that species of material. And if there happens to be a fool or a knave in that sub-department—which is by no means unlikely—the thing gets no further.

Ever since the single Air Force and the Air Ministry was first advocated one has always pointed out that the worst of all objections to the system is the single line of supply. One fool on the line can block everything, like Mr. Kipling's great story (which is not in any book) of the Militia subaltern who blocked the Army's supplies in South Africa by interfering with the laying of a bridge-girder.

Consequently it behoves the Air Ministry to watch its step very carefully for though everybody in the Trade has the greatest admiration for the individual members of the Air Council and for the splendid work which Air Force personnel have done all over the World the Trade as a whole is not at all convinced that from the purely commercial point of view the Air Ministry and its supply system is for the best in the best of all possible air services. After all nobody is in business merely for his health and the Trade has no desire to take sides with anybody or to make enemies either with the Air Ministry as its present only customer or with the Admiralty as a possible future customer. Still the Trade can use if necessary a certain amount of political influence and it would be better to have that influence on the side of the Air Ministry rather than against it. Much may be done by kindness.

Supply and Research.

We may now turn more definitely to the question of Supply and Research, which as the earlier part of this article has suggested is closely allied to such a purely political matter as the Admiralty's war with the Air Ministry. The Air Council has recently acquired a new Air Member for Supply and Research, a distinguished officer with a long and extensive knowledge of flying and of active service conditions. Already he has made his presence felt and numerous improvements and reforms have taken and are taking shape under his guidance. Therefore it will be understood that whatever one may say has no reference to his official acts or to anything which is due to his acts, for he has not held office long enough to be responsible for anything which is wrong to-day. One does not even pretend to suggest any further reforms which he might undertake. One merely professes to set down the opinions of other people on facts which exist.

The first grievance which one meets almost everywhere throughout the Trade is the interference of the petty officials at the Air Ministry or under the Air Ministry and at Farnborough with the liberty of the Trade in design and construction. It is all very well when a certain type of aeroplane or engine or gadget has been adopted as standard for the R.A.F. that Air Ministry officials should check the calculations and analyse the materials and do everything necessary to maintain the high quality of the finished article. And it is absolutely necessary that when a new design is wanted the requirements for that design should be laid down by competent officials with war-flying experience. But it is merely a nuisance when a whole bunch of pseudo-scientists without either experience or education (in the wider sense of the word) are let loose to spoil the designs of a better man.

Right and Wrong Ways.

If the Supply Department went to the Trade and said "We want a machine for (say) bombing, to carry such a load such a distance at such a speed and to carry such a crew and armament and such gadgets for navigating and signalling. Now let us see what you can design. If we approve we will order samples," then all would be well. That is in theory more or less what is done. But in practice first one sub-department butts in and then another till the designer is simply paralysed.

One insists on a certain type of radiator; another insists on certain experimental gadgets; another wants a deck-landing undercarriage of the most awkward type; another insists on steel of a certain chemical analysis in certain places (and cheerfully passes wiring-plates of aluminium alloy in a more vital spot); another insists on three-ply wood where a real designer would use aluminium sheet; and another insists on steel tube where wire cable would do better. And so forth and so on until a firm's experimental machine instead of being an experiment in aerodynamic design becomes a kind of exercise yard for all the little half-baked brains out of the cubby-holes at the Air Ministry.

We should in fact get far more aerodynamic progress if the whole of the Technical Department were wiped out and if the production of new machines were left to a discussion between active-service pilots and aircraft constructors with the Aeronautical Inspection Department as a sort of umpire to see that each side had fair play, the pilot on the one hand having a machine which would be safe to fly and the constructor on the other hand being allowed to make a machine which it was possible to construct as a commercial proposition.

A Case in Point.

One has only to recall the slot-winged Handley Page, commonly known as the "Heinz Biplane" because of its "57 Varieties" of levers and gadgets, to realise the folly of the present system. If H.P. Ltd. had merely been asked to produce a slot-winged biplane with a Napier engine to carry a certain load at a certain speed the machine could have been produced in a fraction of the time which was spent on it in fitting all the Air Ministry's comic gadgets, gilguys and doo-hickies. We should have been just that much further ahead in our knowledge of what can or cannot be done with a

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slotted wing. And the Air Vote would have been saved all the money which was spent on fitting what the immortal Mr. Emanuel Pyecroft called "a whole switch-board full of nickel-plated muckin's," most of which are torn off and thrown into the corner of a shed when a machine goes to an experimental station or a development squadron.

The truth—for the benefit of Those in High Places at the Air Ministry—is that the Trade is fed to the teeth with all these incompetent minor officials but the Trade dare not say so because if it did and the said incompetent little officials still held their jobs, the firms which objected would suffer from reprisals at the first available opportunity. Which would not matter but for the fact that we are condemned to the single line of supply. And the worst of it is that under the Geddes Axe a number of the more competent officials have been removed while the incompetent remain.

The R.A.E. Factory.

The Trade's other great grievance on the Supply and Research side is the Royal Aircraft Establishment. Last year it absorbed something like £750,000. This year it is cut down to something less than £500,000. But what has it to show for its money in any case?

We have been told officially that it is *not* reconditioning aeroplanes and that it is not "producing" in competition with the Trade. Very good; but what *is* it doing to justify its existence?

Nominally it exists for purposes of experiment and research. When one was there a couple of years ago Mr. Sydney Smith, the able Superintendent, showed one a deal of interesting experimental and research work in progress. He had already evolved much order out of the Factory's war-time chaos and it looked as if the place might be worth while. But so far as one can discover the benefit conferred on the Trade and on aeronautical progress since then has been nil.

Possibly if a firm sends a wing or fuselage or airscrew there to be tested to breaking point that firm may in the course of a long time be given the figures desired. But one has not heard of any results from the R.A.E. being distributed to the Trade to help general progress. Possibly some firms which employ former officials of the R.A.E. may get the results of tests unofficially in reasonable time. But such results as have been published in official documents seem as a rule to relate to experiments whose value departed years before either because the actual object of the experiments had become obsolete or because the Trade itself had done all the experiments and let the results become known before the R.A.E. had got half-way.

Two Vital Matters.

For example, what has been made known to the Trade about the semi-Diesel engine experiments or those with direct injection of fuel which have been going on for years? And has any information been imparted to aircraft constructors about slow-flying experiments—those quaint Avros with gargantuan tails seem to have been floating about for aeons—which will help them to solve the greatest of all aviation problems? There you have the two things necessary to make Civil Aviation a success, (a) The abolition of petrol and (b) The ability to fly at 150 miles an hour and to land at 20 miles an hour.

Given those desiderata flying becomes as safe as motoring or more so. The R.A.E. has been working at them for years. Is it any nearer to them than it was three or five or ten years ago? If so how much? The Trade does not seem to know even if the R.A.E. officials do.

Meantime Beardmore's are said to be very near the non-petrol engine, and what with slotted and flapped wings ordinary (or perhaps one should say extraordinary) aircraft firms are mighty near the desired speed-range. Have they got so far with the help of the R.A.E. or without it? Many people would like to know.

Now if professional Trade firms can get so far without the help of the R.A.E. will somebody please demonstrate why the R.A.E. exists? If that £750,000 which was spent on the R.A.E. last year had been spent on the R.A.F. the Air Force might have had new machines for all its active squadrons, or at any rate for all its training stations and we should not have had that poor lad killed at Shotwick the other day through the breaking in the air of a machine built of war-time emergency material.

Results, Please.

Some of one's friends in the Trade have averred that they have received very interesting information from the R.A.E. Very possibly so. But has it and what the rest of the Trade has received been worth £750,000? That is the real point.

Should we not get very much better results very much quicker if the Air Member for Supply and Research set aside £500,000, or whatever may be the R.A.E. Vote, for experiment and research and handed it out in adequate sums to various firms in the Trade to be spent under supervision on research towards definite ends (*ad hoc* research, as it is called)? Basic research, as distinct from *ad hoc* research could be done quite well enough at the National Physical Laboratory and at the various science colleges which are subsidised out of the Air Vote.

Of course our good Labour Members who made fatuous remarks in the Commons the other day would leap in wrath about throwing all the R.A.E. men out of jobs. The answer is simply that those of them who were willing to work would very soon find plenty to do in the efficiently run factories of the Trade, though probably after a period at the R.A.E. most of them would be rather like the Irishman who, on applying for a job and being told that there was no work for him to do, replied "Ah sure the little bit I'ld do would make no differ."

The Wrong Place and the Wrong Atmosphere.

The fact is that no matter how well it is run the R.A.E. can never justify the money which is spent on it. The place is too huge and ungainly to be any use except as a mass-production factory. And that it must never be allowed to become. Also much of the old "Factory" atmosphere still hangs about it despite the friendliness of its Superintendent to the Trade. The place started wrongly and it has never been properly disinfected.

The staff were originally of that half-baked scientific class, the products of suburban technical schools and polytechnics with whom, as one said early in the War, "the common or conversational *h* and not the scientific *x* is the unknown quantity." They were not properly of the working class and being Government officials they affected to despise while secretly envying the mere Trade, most of whom are men of very good education. The worst of the gang have gone, but the atmosphere of ill-assumed superiority to the mere tradesman still persists to a certain extent.

Probably if the R.A.E. were disestablished most of the staff would find minor jobs on the experimental staffs of Trade firms where they would be better paid than they are at present and would have much better prospects if they showed genuine ability. In any case those who did not would be much cheaper to the Nation when drawing the unemployment dole than as Government officials spending half a million or so pounds per annum.

One commends to the Air Ministry this simple method of either saving money or of accelerating progress. If the money which is at present being wasted on the R.A.E. were spent in the Trade it would go far towards establishing the Trade on that firm basis which is necessary if it is to fulfil its proper function as the foundation on which the effectiveness of the Royal Air Force, our First Line of Defence, has to rest.—C. G. G.

[Next week one hopes to deal with Civil Aviation from the point of view of the Aircraft Trade.—C. G. G.]

AN AMENDMENT TO THE AIR CONVENTION.

According to the *Manchester Guardian* a protocol to the International Air Convention was signed at the offices of the Convention in Paris on Apr. 1 by Mr. Phipps, Counsellor of the Embassy, on behalf of Great Britain, South Africa and India; by Sir Joseph Cook on behalf of Australia; and by Sir James Allen on behalf of New Zealand.

The protocol amends Article 5, which provides that no signatory country shall permit the aircraft of a non-signatory to fly over the former's territory. An exception to this rule is now authorised whenever a special convention based on the principles of the International Convention is concluded between a signatory and a non-signatory Power. Of the 19 signatories of the International Convention 10 have now signed the protocol.

ATMOSPHERICS.

Sir Sefton Brancker addressed the world at large on Monday evening from the London Station of the British Broadcasting Company. His subject was Air Transport but unfortunately one is not able to record his speech. At his opening sentence one's own set gave forth a piercing scream, and refused to be comforted for the rest of the evening. Finally one valve went. One wonders whether one is entitled to charge this up to General Brancker.—G. D. [That is the worst of these amateur wireless experts who go and buy penn'orths of wave-length and inductances and things.—Ed.]

WHAT'S IN A NAME?

The Air Ministry, in common with so many war-time departments, has acquired the habit of coining cacophonous words for its own fell purposes, particularly in the matter of departmental names. "Directorate" is common in all Government offices. "Inspectorate" is a worse effort. But the ugliest word so far discoverable in the Air Force List is "Controllerate." It only remains for the Planning Department, which prepares for things which are expected to happen, to be renamed the "Expectorate."

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The instalment of the articles on the vortex theory published in this issue shows how it has been developed to apply to real wings, with remarkably accurate results.

There is given as an appendix to this instalment a note as to the practical methods of applying the theory to calculate the effect on a monoplane of changes of aspect ratio.

A very ingenious petrol gauge, which would appear to supply a want which has long been felt acutely in the case of aeroplanes, is described in this issue.

A series of notes dealing with recent and future gliding and low-powered flying meetings and performances is given in this issue.

VORTICISM IN AERONAUTICS.—IV.

By W. H. Sayers.

The semi-elliptical distribution is not unlike the distribution found on real wings. It gives a downward velocity which is constant over the whole span, so that its effect on a wing of defined span is equivalent to tilting the whole wing through a fixed angle. A variable down-wash would involve warping the wing to reproduce similar conditions for varying mean strengths of down-wash.

This condition of uniform down-wash is also the condition of minimum "induced drag" for any given set of conditions, and it follows from certain well-known laws that a fairly large change of the lift distribution from the assumed elliptical distribution will not very greatly change the resulting "induced drag."

The assumption of elliptical distribution of lift leads to quite simple relations between lift and induced drag.

The "induced drag" is proportional to the square of the lift, is inversely proportional to the square of the stream velocity and also inversely to the square of the span.

This result does not involve the chord of the wing at all—and it shows that the "induced drags" of any two wings which are of the same span, and which carry the same total load at the same speed are exactly equal. In this form the result has little direct practical value, but by a very simple transformation the original relation between "induced drag" lift, speed and span can be transformed into one between induced drag and lift coefficients and aspect ratio, speed disappearing altogether.

It is then found that the coefficient of induced drag is proportional to the square of lift coefficient, and is inversely as the aspect ratio. From this relation it is simple to calculate the change of "induced drag" caused by any change of aspect ratio.

Also as the induced drag is the result of tilting back of the whole airflow and aerofoil system, the fact that one can calculate induced drag means that one can calculate the angle of tilt appropriate to any aspect ratio for any given lift coefficient.

It should be quite clear that on this theory a change of aspect ratio not only alters the "induced drag" for each value of lift coefficient but also alters the apparent angle of incidence at which each lift coefficient is developed by any particular wing section.

The test of a theory such as this is obviously to discover whether in fact wings do behave in the manner which it predicts. Tests were made as long ago as 1913 to discover whether there was any correspondence between the real drag of an aerofoil and that indicated by theory. These tests gave unsatisfactory results, owing to the poor quality of the sections then known. With more efficient modern sections a series of tests which confirms the theory in an extraordinary way have been made.

In Fig. 18 the result of tests on a wing of aspect ratio 5 is shown. Lift coefficients (Ca) are plotted against drag coefficients (Cw). It should be noted that these figures are given in German units and that they require to be divided by 200 to give the usual British coefficients.

The curve which touches the extreme left margin of the figure at O is the theoretical induced drag. The curve farther to the right marked by small circles is the measured curve for the real wing. It will be noticed that over a considerable

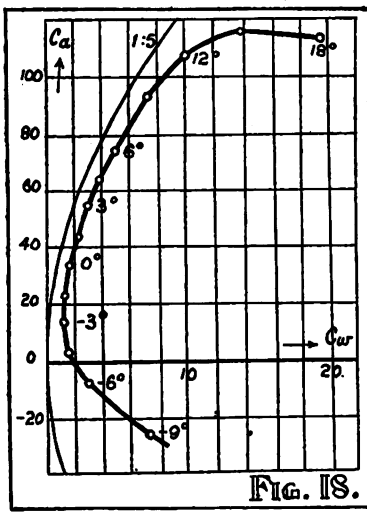

FIG. 18.

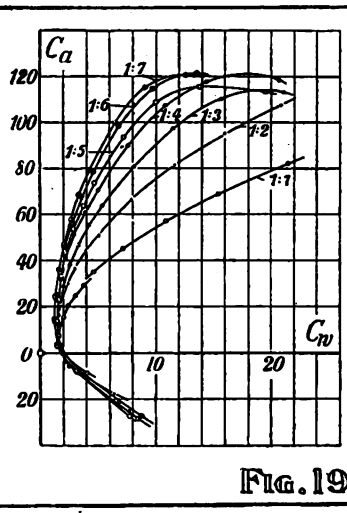

FIG. 19.

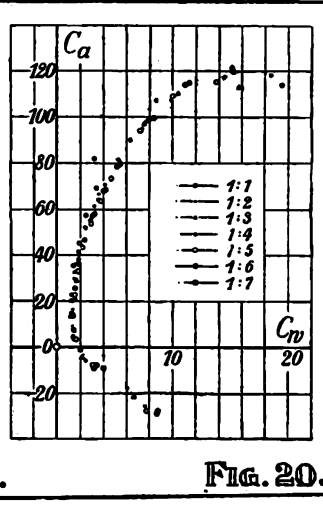

FIG. 20.

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range the two curves are practically parallel, the divergence becoming serious only in the neighbourhood of no lift, and when the real wing is at about 12° incidence—approaching the stalling angle.

This process has been repeated for wings of different aspect ratios. A set of curves showing the lift and drag of a series of wings of aspect ratios varying from 1 to 7 are shown in Fig. 19.

By making the assumption that change of aspect ratio will not alter that part of the drag which is caused by viscous friction, and that only the induced drag was altered, the lift and drag figures for an aerofoil of aspect ratio 5 was deduced by the theory from each of the separate curves of Fig. 19.

The result is shown on Fig. 20, where it is obvious that the points deduced from all the curves of Fig. 19—with one or two exceptions in the case of the wings of aspect ratios 1 to 3—lie very closely indeed on the same curve, which is to all intents and purposes that experimentally found for the aspect ratio 5.

A similar check has been applied to the theory of the change in angle of incidence caused by change of aspect ratio, using the same set of models. When the lift is plotted against angle of incidence seven distinct curves are obtained.

By deducing from each wing from the theory what the angle of incidence of a wing of aspect ratio 5 should be for each measured lift, one single curve corresponding to the observed curve of aspect ratio 5 was obtained.

These two checks on the theory are sufficient to prove that for practical purposes one may assume that the drag of a real wing can be regarded as composed of two parts, one the "induced drag" of theory the other a drag due to viscous forces.

The induced drag varies with aspect ratio and this variation can be calculated.

The viscous drag does not vary with aspect ratio but is always the same for the same section of wing.

Therefore a test at one aspect ratio is sufficient to determine the behaviour of a wing of the same section at any aspect ratio greater than about 3.

THE CALCULATION OF THE EFFECT OF CHANGE OF ASPECT RATIO.

The majority of model tests on wings which are available for design purposes are made at one standard aspect ratio —usually 6 in this country. The designer has to estimate the effect of any change from this value which may be necessary in a particular case.

By means of the expressions derived from the vortex theory by Prandtl and others, the effect of any such change can be calculated very simply, and therefore it is thought that it may be worth while to give the necessary expressions here.

The "induced" drag co-efficient K_{Di} is given by the following expression :—

$$K_{Di} = \frac{2K_L^2}{\pi} \cdot \frac{1}{n} \quad (1)$$

Where K_L is the lift co-efficient and n is the aspect ratio.

Given the result of tests on a wing of known aspect ratio the general problem is to find the drag of a wing of the same section, but different aspect ratio.

Let n_1 be the aspect ratio of the tested wing
n_2 be the aspect ratio of the new wing
K_{D_1} be the drag coefficient of tested wing
K_{D_2} be the drag coefficient of the new wing
Then

$$K_{D_2} = K_{D_1} + \frac{2K_L^2}{\pi} \left(\frac{1}{n_2} - \frac{1}{n_1} \right) \quad (2)$$

This relation is true for the whole drag co-efficient because there is no change in the viscous or frictional drag caused by change of aspect ratio.

The change of angle of incidence for a given lift co-efficient which results from change of aspect ratio is equally simply calculated. Calling the angle of tilt of the airstream system α

$$\alpha = \frac{2K_L}{\pi} \cdot \frac{1}{n} \quad (3)$$

Given the incidence α_1 for any lift coefficient K_L of the wing of aspect ratio n, to calculate the angle of incidence α_2 of the wing of aspect ratio n_2 the expression

$$\alpha_2 = \alpha_1 + \frac{2K_L}{\pi} \left(\frac{1}{n_2} - \frac{1}{n_1} \right) \quad (4)$$

may be used.

α is here expressed in radians, and must be multiplied by 57·3 to give the angle in degrees.

The lift and drag coefficients in the above expressions are the ordinary British absolute units.

For wings which are not rectangular in plan the aspect ratio should be taken as span divided by mean chord, or $S \div A^2$ where A is the area of the wing and S the span. The results will be found to apply with quite good accuracy to wings of tapered plan, provided the taper is not exaggerated. In the case of a wing tapering to a point, each half of which was a triangle, having a mean aspect ratio of 9·9, the induced drag given by the expressions above is too low by about 12 per cent., but for wings of elliptical, trapezoidal and round-tipped types the results obtained by formulæ 2 and 4 are of sufficient accuracy for all practical purposes.

(To be continued.)

THE RUNBAKEN PETROL GAUGE.

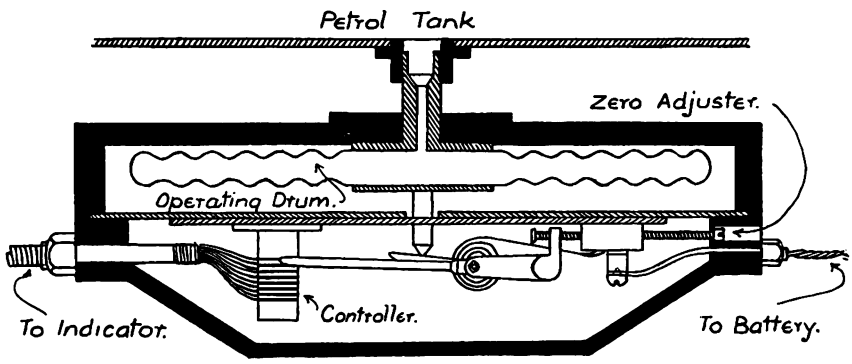
A satisfactory distance-reading petrol gauge has long been desired for use on aircraft, but up to the present no such appliance has been developed which really worked well under all conditions.

The Runbaken Magneto Co. Ltd., of 142 Gt. Portland St., London, W.1, have recently produced a dashboard petrol gauge which has given thoroughly satisfactory results on motor-cars, and there does not seem to be any reason why it should not be satisfactory on aeroplanes.

The gauge is actually operated by the pressure due to the head of petrol in the tank, and consists essentially of two parts—one a pressure meter and the other the dashboard indicator.

The pressure meter consists of a corrugated pressure box very similar to that used in the ordinary aneroid barometer. This pressure box is screwed into the bottom of the petrol tank, the inside of the box being in communication with the tank. The greater the head of petrol, the more the diaphragm expands. The expansion of the diaphragm is communicated very simply to a pair of pointers, very much as the movement of a recording aneroid diaphragm is communicated to the pen. These pointers however instead of moving over a scale move over a composite block consisting of alternate sheets of metal and of insulating material. The pointers are in spring contact with this block and so form in fact a movable switch which makes contact successively with one of the series of contacts of the block.

The selective switch thus formed serves to couple up to a battery one of a number of coils wound on a soft iron core which is contained in the dashboard indicator, with the result that this core becomes magnetised. The position of the N and S poles of the electro-magnet so formed moves round the core, in accordance with the position of the con-



Section of the pressure-measuring device of the Runbaken Petrol Gauge. The corrugated controlling drum is distended according to the height of petrol in the tank above. The system of levers which move the contact fingers over the sectional contact block or controller is clearly indicated. The whole apparatus is shown in a sketch on the following page.

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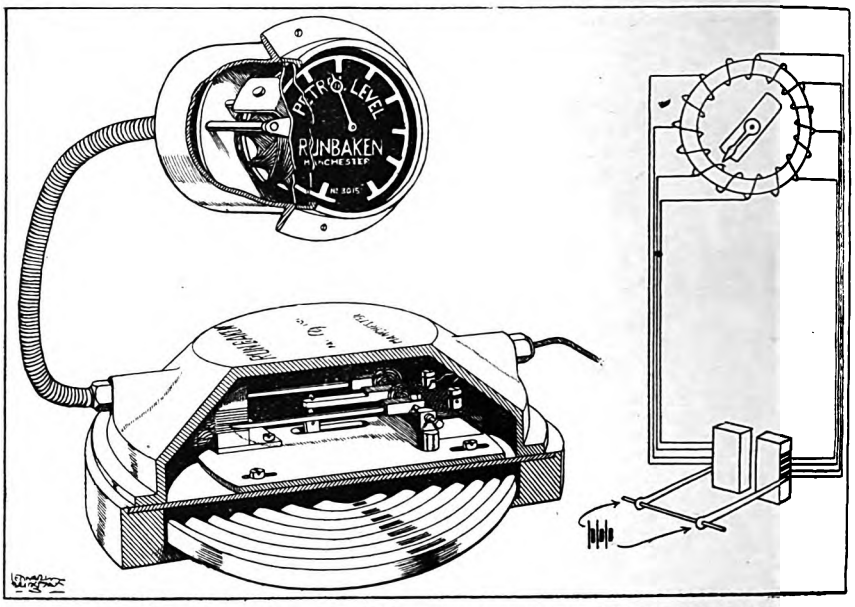

Part section of the Runbaken Petrol Gauge. In this sketch the pressure-measuring device shown in section on the previous page is inverted for clearness. Above it is seen the dash-board indicator showing the wound core of the operating electro-magnet and one pole of the moving permanent magnet. On the right the electrical circuit of the indicator is shown diagrammatically.

tact arms of the pressure meter, that is to say according to the head of petrol in the tank.

A pivoted permanent magnet of U section embraces the electrically-magnetised core, and is constrained by the field of the electro-magnet to move so that its N pole is always opposite the S pole of the electro-magnet.

A needle on the same spindle as the permanent magnet moves over a graduated scale and so indicates the amount of petrol in the tank.

For pressure tanks the pressure diaphragm is enclosed in an air-tight case which is connected to the top of the tank.

Obviously by modification of the "scale" of the selector switch block in the pressure meter, and by suitably calibrating the dial of the dashboard indicator the apparatus may be made to suit any size or shape of tank.

The instrument is very simply and well made and it appears to be immune from the effects of ordinary vibration. It will of course read incorrectly during manœuvres which cause large accelerations as these will alter the pressure due to a given head of petrol in the tank—but one does not expect to measure petrol during a loop or when flattening out from a dive—and in ordinary steady flight the instrument should give quite reliable indications.

GLIDING AND LOW-POWER FLYING.

M. BARBOT'S FLIGHTS.

France appears to be getting extremely excited over M. Barbot's performances on a Dewoitine glider fitted with a small engine said to develop 7 h.p.

On Apr. 2 M. Barbot got off and flew for 15 mins. at a speed of some 90 km./h. (56 m.p.h.) and on the following day he flew for some 25 mins. at 1,500 ft. over the city of Toulouse. The machine itself weighs it is said some 225 kg. (500 lbs.) and it is alleged to consume less than one gallon of petrol per 100 miles.

These tests are an interesting confirmation of views which have long been asserted in this journal—but so far as can be gathered M. Barbot's flights are by no means surprising. During the war the Grain "Kitten," for whose design the writer was responsible, showed that it was possible to build a structurally sound aeroplane which fully loaded with a Lewis gun and ammunition weighed under 500 lbs.

This machine fitted with an engine developing 35 h.p. was of the high-performance type—nevertheless it made 40 miles to the gallon at 105 m.p.h. and over 60 m.p.g. at 70 m.p.h., and from its climb showed that it could fly level with 6 B.H.P. at about 50 m.p.h.

It is also gratifying to be able to state that England is in other respects not behind France, for within the past few days an English-built machine fitted with a 2-cylinder opposed engine of a little less than 400-c.c. capacity has successfully left the ground.

This machine, the "Wren," is described elsewhere.

GLIDING IN THE R.A.F.

S/Ldr. A. Gray of Itford fame, after some tribulation in discovering the necessary components for a Brokker No. 2, has now completed a considerably improved machine of this type at the C.F.S. at Upavon.

A number of successful tests have been carried out at Upavon and it is understood that the machine is to be removed to some slightly more favourable hills in the vicinity for further experiment.

THE SECOND FRENCH GLIDING MEETING.

In August of this year the Association Française Aérienne are organising the second Congrès Expérimental d'Aviation sans Moteur which will take place at Vauville, near Cherbourg.

The regulations governing this meeting have not yet been published, but in the meantime entries, applications for information, etc., should be addressed to the Secretary, l'Association Française Aérienne, 17, Boulevard des Batignolles (VIIIe), Paris.

The meeting will be under the patronage of M. Laurent Eynac, the French Under-Secretary of State for Aeronautics, and a total sum of 100,000 francs will be available for prizes. The list of competitions, which can be obtained from the Secretary on application, includes distance, height and duration contests, gliding in horizontal currents, etc., for both engineless and auxiliary engine gliders.

As the last year's Combegrasse meeting the Vauville meeting is of an international nature and it is hoped that a representative entry list will be forthcoming.

ROLLS-ROYCE AND THE NEW AIR TRANSPORT CO.

At the annual general meeting of Rolls-Royce Ltd. the chairman, Lord Wargrave, voiced a certain anxiety as to the possible effect on the aero-engine industry if the proposed single Air Transport Company foreshadowed by the recent report on subsidies should come into existence. He suggested that if the single monopolistic concern did materialise that as a matter of economy the company would order all its engines from the one firm of engine makers—thus putting all other firms out of this business.

This seems a somewhat far-fetched idea, particularly as one of the main reasons underlying the scheme for the one big air line is the establishment of a company with sufficient resources to carry on practical research and development.

A firm which begins such an undertaking under the delusion that it can at once decide on a standard engine type will not go far—and is scarcely likely to get the chance of going at all.

Added to which if the said firm used nothing but surplus engines already in existence it would for some few years at least make little difference to the market for modern British engines which in any quantity are luxuries for which only the Royal Air Force can at present find the money.

METAL CONSTRUCTION IN ENGLAND.

The Air Navigation and Engineering Co. Ltd. of Addlestone, who have just designed the very interesting little sporting monoplane recently designed, announce that they now own all British rights in the methods of metal aircraft construction developed by the Spad concern in France, and that they are prepared to undertake all metal aircraft work.

The type of construction in question involves the use of duralumin, or a similar light alloy in the form of drawn tubes, together with dished strip bracing members of a standard section. The number of sections used is thus reduced to a minimum, with a consequent reduction in the cost of dies, etc.

Fastenings are all made by the use of a form of hollow rivet which should require considerably less labour and skill for satisfactory assembly than does the normal type of small solid rivet.

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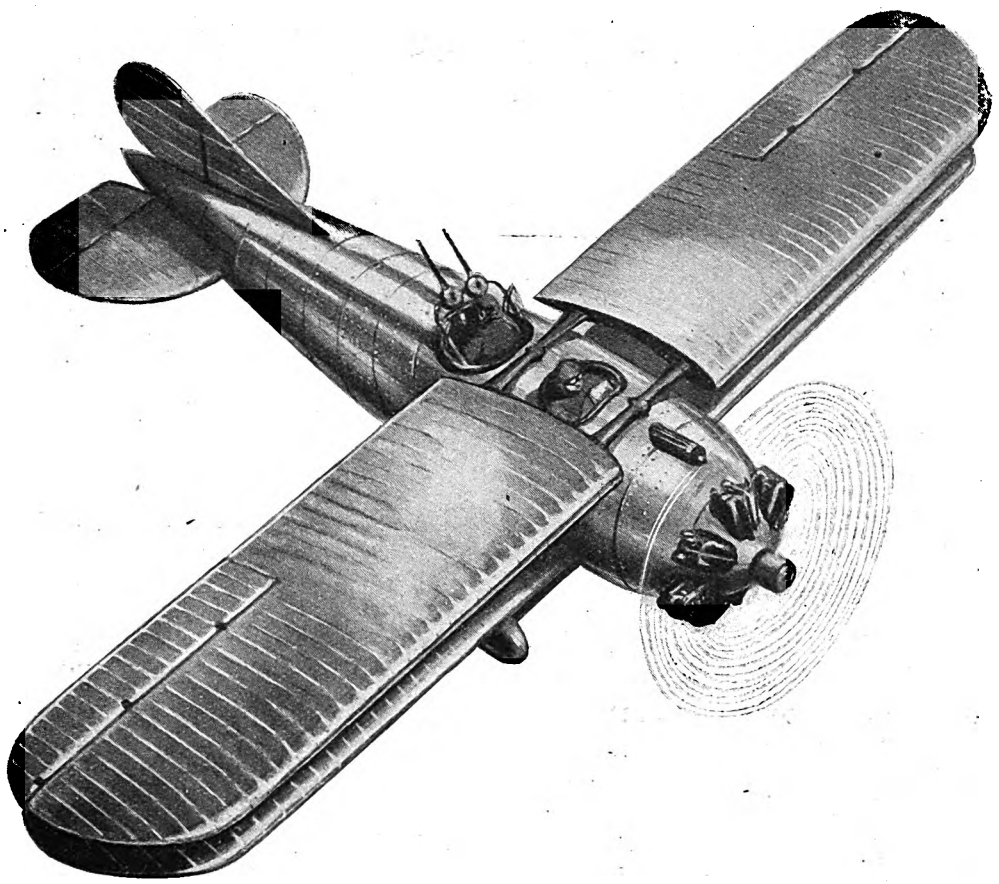
ALL-METAL

AEROPLANES AND SEAPLANES.

Designers and Constructors of All-Metal Aircraft for the British Government.



As a result of the most exhaustive tests carried out by the R.A.F. Factory on the "Short" All-Metal Aeroplane, Messrs. Short Bros. have now received an order for further machines of this type. When completed these machines will be the only All-Metal machines, that is to say, machines complete with metallic surfaces, to be made in Great Britain.

SHORT BROS.

(ROCHESTER & BEDFORD) LTD,

WHITEHALL HOUSE, 29-30, CHARING CROSS, LONDON, S.W.1.

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R.A.F. INTELLIGENCE.

Appointments.

Air Ministry, Apr. 4.

General Duties Branch.—Air/Cmdre. T. I. Webb-Bowen, C.B., C.M.G., to No. 3 Group H.Q., Spittlegate, to command, 16/4.

Wing/Cmdr. A. S. Barratt, C.M.G., M.C., to No. 3 Group H.Q., Spittlegate, for Air Staff duties, 6/4.

F/Lts. J. R. Howett, to No. 12 Sqdn., Northolt, 4/4; H. W. G. Jones, M.C., to No. 41 Sqdn., Northolt, 4/4, instead of to Cranwell as previously notified; J. A. Glen, D.S.C., and M. H. Butler, D.F.C., to No. 32 Group H.Q., Spittlegate, 4/4; H. E. Walker, M.C., D.F.C., to No. 32 Sqdn., Kenley, 4/4.

F/Os. H. C. Pyper and W. V. Hyde, to No. 41 Sqdn., Northolt, 4/4; F. F. Garraway and F. W. Brown, to No. 3 Grp. H.Q., Spittlegate, 4/4; J. G. Argles, to Basrah Group H.Q., Basrah, 4/1.

Stores and Accounts Branch.—F/Lts. (Stores) F. Petch, O.B.E., and C. M. Bevan, to No. 3 Group H.Q., Spittlegate, 4/4.

F/Os. (Stores) V. S. Holbrook, to No. 41 Sqdn., Northolt, 4/4.

Medical Branch.—F/Lts. (Medical) J. A. Musgrave, D.P.H., to R.A.F. Base, Gosport, 5/4; E. G. S. Hall, M.B., to No. 1 School of T.T. (Boys), Halton, 4/4.

Air Ministry, Apr. 6.

General Duties Branch.—Wing/Cmdr. G. P. Grenfell, D.S.O., to No. 7 Group H.Q., Andover, for Technical Staff duties, 9/4.

S/Ldr. P. C. Sherren, M.C., to Armament and Gunnery School, Eastchurch, for course of instruction, 4/4.

F/Lts. W. A. C. Morgan, M.C., to No. 1 F.T.S., Netheravon, 9/4; R. Whitaker, M.B.E., to No. 1 Stores Depot, Kidbrooke, 9/4; G. H. Cooper, M.C., D.F.C., to No. 10 Group H.Q., Lee-on-Solent, 9/4; E. Drudge, M.B.E., to No. 10 Group H.Q., Lee-on-Solent, 9/4; H. H. James, to R.A.F. Depot, Uxbridge, 1/4.

F/Os. G. G. Walker, M.C., to No. 2 F.T.S., Duxford, 9/4; P. Murgatroyd, to School of Army Co-operation, Old Sarum, 9/4; H. Butlin, to No. 2 F.T.S., Duxford, 4/4; C. E. F. Boyes, to No. 100 Sqdn., Spittlegate, 3/4.

Stores Branch.—F/Lt. (Stores) W. Sutherland, M.B.E., to No. 1 Stores Depot, 9/4.

Medical Branch.—F/Lt. (Medical) O. Armer (Dental), to R.A.F. Base, Leuchars, 9/4.

In Memoriam.

The Turnberry War Memorial in memory of the Members of the Royal Air Force who gave their lives for King and Country while training in the Turnberry School of Aerial Gunnery will be unveiled by the Most Honourable the Marquess of Ailsa, Lord Lieutenant of Ayrshire, on Saturday, Apr. 28, 1923, at 3 p.m.

A cordial invitation to be present is extended to Relatives and Friends and all others interested.

The Shotwick Accident.

An inquest was held at Heswall on Mar. 28 on the body of Robert Cecil Brooke-Hunt, aged 25, a pilot officer in the R.A.F. who was killed in an accident on Mar. 26. F/O. C. W. Busk said that the machine had undergone a 15-minutes' test before being handed over to Mr. Hunt and F/O. Evans who tested the machine said that it was in perfect condition. The noise was probably due to the machine breaking up.

In reply to the coroner, Mr. Evans said that it would be quite possible for the accident to have occurred in pulling such a heavy type of machine out of a steep dive. The coroner said that it was clear that the machine gave way in the air and there was no explosion. The machine was in perfect order when it left the aerodrome. Possibly the pilot took a course that he should not have done. A verdict of "Accidental death" was returned.

R.A.F., Middle East.

A Reunion Dinner for past and present Officers of the R.N.A.S., R.F.C., and R.A.F., who served in the Middle East during the war, will take place at the Café Royal, Regent Street, W., on June 6 (evening of Derby Day). Particulars apply F/Lt. G. C. Anne, 62 Kensington Mansions, Earl's Court, W.5.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

Golf.

A golf match between D.D.R. (Armament), Air Ministry and the Marine and Armament Experimental Establishment, Isle of Grain, which took place recently, resulted in a win for the latter by 4 points to 2. Details :—

Singles :—*D.D.R. (Armt.)* lost to or beat *M. and A.E.E.* as follows :—W/Cmdr. F. D. M. Robertson lost to F/O. E. P. M. Davies, 1 up; Maj. Thompson beat F/Lt. R. G. Horne, 6 and 5; Capt. Riddell lost to S/Ldr. J. K. Wells, 5 and 4; Capt. Hopcroft beat F/Lt. T. le G. Pynches, 2 up.

Foursomes.—D.D.R. (Armt.) lost to M. and A.E.E. as follows :—W/Cmdr. F. D. M. Robertson and Capt. Riddell lost to S/Ldr. P. K. Wells and F/O. E. P. M. Davies, 2 up. Maj. Thompson and Capt. Hopcroft lost to F/Lt. R. G. Horne and F/Lt. T. le G. Pynches, 5 and 4.

R.A.F., Mediterranean.

R.A.F., Unit, H.M.S. "Pegasus."—Participation by the personnel of this Unit in all forms of recreation has continued to be limited to that obtainable on board owing to the conditions of service prevailing throughout the month.

R.A.F., Unit, H.M.S. "Ark Royal."—Although two football matches have been played by the R.A.F. Unit against the ship's company conditions prevail similar to those obtaining in H.M.S. *Pegasus*.

No. 267 Squadron, Calafrana.—*Hockey* :—Five matches were played during the month, the results being as under :—1st, v. H.M.S. *Marborough*, lost 1—4; 10th, v. H.M.S. *Marborough*, lost 2—8; 14th, v. An Army Eleven, won 8—3; 17th, v. H. M. S. *Thunderer*, draw 3—3; 27th, v. Eastern Telegraph Co., lost 1—3.

The table to the end of the month stands thus :—Played 17. Won 7. Lost 7. Drawn 3. Goals for, 46. Goals against, 47.

Association Football : Four matches were played, with the undermentioned results :—1st, v. H.M.S. *Caradoc*, won 6—1; 14th, v. R.A.S.C., draw 2—2; 15th, v. R.A.M.C., won 5—2; 17th, v. H.M.S. *Egmont*, lost 0—1.

The table to the end of February stands as follows :—Played 26. Won 12. Lost 6. Drawn 8. Goals for, 64. Goals against, 46.

A REMARKABLE AEROPLANE.

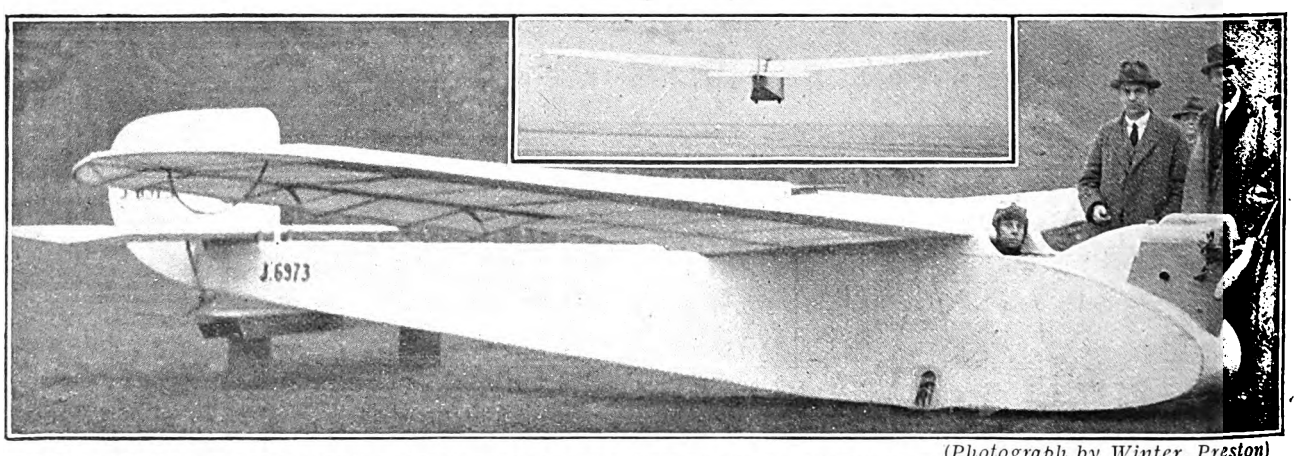
The "Wren" monoplane, designed by Mr. W. O. Manning of the English Electric Co., and built at the firm's works at Preston to the order of the Director of Research the Air Ministry, is an attempt to see how far it is possible to go in the direction of reducing the power required for flight to a minimum by the utmost cleanliness of design combined with light construction.

The "Wren" is in fact a machine based on glider practice, and it is fitted with a standard A.B.C. motor-cycle two-cylinder-opposed motor-cycle engine of 398 cubic centimetres cylinder capacity and of nominally 3 h.p.

It is a pure cantilever monoplane of 37-ft. span with the wing placed on the top surface of a rectangular section fuselage. The pilot is seated with his head in a recess in the leading edge of the wings.

The fuselage slopes downward ahead of the pilot, and the engine which drives the airscrew directly is carried on a tubular engine mounting raised from the nose of the fuselage. This mounting is thoroughly faired in and it also carries the petrol tank.

The undercarriage consists of an axle inside the fuselage,



(Photograph by Winter, Preston)

THE "WREN."—A remarkable monoplane built by the English Electric Co. Ltd., which flies with 3½ h.p. The designer, Mr. W. O. Manning, is seen on the extreme right and the Air Ministry's test pilot, S/Ldr. Maurice Wright, is in the pilot's seat. Inset the machine is seen in the air.

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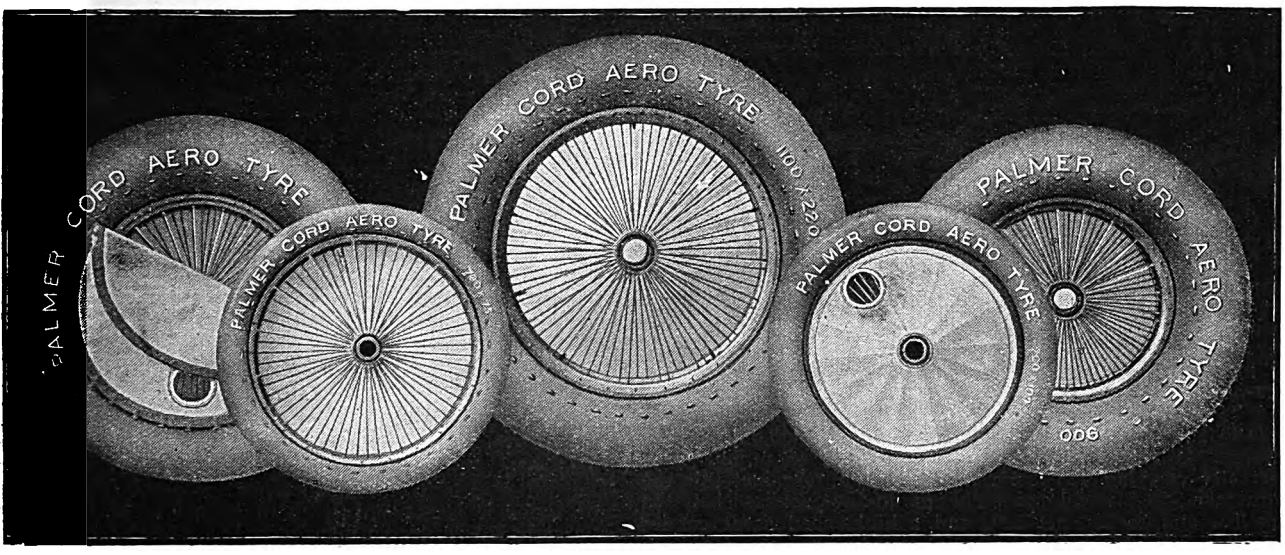
PALMER

LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
,,	138	130.	38.09	Central
575×60	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
600×75	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
700×75	78	178.	44.45	132 46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132 46
,,	101	178.	31.75	132/46
700×100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
700×100	96	178.	55.	132/46
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
650×125	119	178.	55.	132/46
750×125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	96	178.	55.	132/46
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
800×150	82	185.	55.	135/50
,,	85	185.	55.	Central
,,	36*	185.	55.	135/50
,,	40*	185.	60.32	135/50
,,	152	185.	66.67	135/50
,,	163*	185.	66.67	135/50
1000×150	131	220.	66.67	Central
,,	102	185.	55.	125/60
,,	141	250.	80.	Central
,,	201	185.	60.32	125/60
1000×150	209	185.	55.	Central
,,	210	185.	60.32	Central
1000×180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
900×200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	202	185.	60.32	Central
1100×220	134	220.	66.67	Central
,,	136	250.	80.	Central
1250×250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500×300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
1750×300	139	400.	152.4	Central

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with rather less than half the wheels projecting through the bottom of the fuselage.

The tail unit is of normal form—there is a fair-sized fixed tail-plane as well as elevators.

The overall length is about 23 ft., the maximum height is a little under 5 ft., and the empty weight of the machine is 205 lbs. The airscrew is of 3 ft. 9 ins. diameter and turns at about 2,600 r.p.m. on the ground.

Tests have been made on this machine by S/Ldr. M. E. A. Wright of the D. of R.'s Department, the Air Ministry. Preliminary trials made at Ashton Park, Preston, were confined to runs of 100 yds. or so at a few inches from the ground to test controls.

The machine was then taken to Lytham sands, and on Saturday S/Ldr. Wright made a flight of about seven minutes. The machine got up after 50-yds. run, and climbed quickly to about 300 ft. It appears to have ample reserve power—as it climbs at 41 m.p.h. with the engine well throttled—in fact it is said on good authority that it flies stronger than a "Longhorn" Maurice Farman.

The machine's stalling speed is about 25 m.p.h., and apparently the top speed will be at least 50 m.p.h.

Altogether the machine is a most interesting experiment and considerable credit is due both to Mr. Manning and to the Department of Research for having carried it through so quickly.

Certain points about this interesting machine are particularly well worth noting.

The engine has a capacity of 398 cubic centimetres. To get a mental scale this may be compared with the 500 cubic centimetres of the single-cylinder "Triumph" motor bicycle which is familiar to everybody. The nominal power of the engine is 3 h.p. but at full revs. it possibly gives between 7 h.p. and 8 h.p. At a flying speed of 40 m.p.h. the horse power is about 3½.

The weight of the machine empty is 210 lbs. Allowing 140 lbs. for the pilot and 10 lbs. for petrol and oil its total weight is thus 360 lbs. Consequently at 40 m.p.h. it is actually carrying 100 lbs. weight per h.p. Against this the ordinary commercial aeroplane of to-day carries between 15 lbs. and 20 lbs. per h.p. and a high-speed scout carries about 6 lbs. per h.p. Naturally one has to pay for high speeds, nevertheless the achievement is remarkable.

At its top speed the machine is about as fast as a "Longhorn" Maurice Farman and it carries one man with just one-tenth of the power.

It is further worthy of note that the "Wren" with its 3 h.p. nominal engine easily beats the performance of the much-boomed French machine flown by M. Barbot.

Though it has probably cost well over £500 to build this first experimental machine there is no doubt that if standardised for quantity production it could be turned out for something like £120 including the engine. Considering that the ordinary standard training machine costs the Air Force approximately £1,200 it will thus be seen that ten "Wrens" would only cost the same as an ordinary training machine.

Machines of the "Wren" type would be of very great value for the preliminary training of pilots. Being absolutely stable and controllable it would be almost impossible for a pupil to hurt himself and if he damaged the machine repairs would cost next to nothing compared with what they cost on large aeroplanes.

The "Wren" does definitely mark a very great step forward in the history of aviation, for it is the first to prove that an aeroplane can be made to fly properly with a motor-cycle power plant.

PERSONAL NOTICES.

Deaths.

LLANGATTOCK.—On Apr. 1, at South Lodge, Rutland Gate, S.W., Georgiana Marcia, widow of the First Baron Llangattock, and mother of the late the Hon. C. S. Rolls who was killed in a flying accident at Bournemouth in 1910.

LOCH and STRINGER.—On Apr. 7, near Quetta, India, as the result of a flying accident, F/O.s D. R. Loch and H. M. Stringer, both of 20 Squadron, R.A.F.

Engagements.

DORMAN—STEPHENSON.—An engagement is announced between Geoffrey Dorman, late R.E. and R.F.C., only son of the late Mr. Charles Herbert Dorman and Mrs. Dorman, Hillsboro', Sydenham, London, and Muriel Stephenson, younger daughter of Mr. and Mrs. E. M. Stephenson, of 49, Crystal Palace Park Road, Sydenham, London.

MACKENZIE-GRIEVE—BADDELEY.—A marriage has been arranged, and will shortly take place, between Cmdr. Kenneth Mackenzie-Grieve, A.F.C., R.N., youngest son of Capt. and Mrs. Mackenzie-Grieve, of Droxford, Hants, and Janet, youngest daughter of Mr. and Mrs. Clinton Baddeley, of Dibden, Hants.

Births.

BRAND.—On Apr. 4, at 13b, Elsham Road, Kensington, to Marie, wife of S/Ldr. Sir C. J. Q. Brand, K.B.E., D.S.O., M.C., D.F.C., R.A.F.—a daughter.

DISMORE.—To Queenie, wife of R. Dismore, at 16, English Road, Addiscombe—a daughter, on Mar. 24.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 4; Tuesday, 17; Wednesday, 14; Thursday, 17; Friday, 15; Saturday, 22; Sunday, 4.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 19*, passengers 179; Air Union, machines 30†, passengers 109; Total machines 49; passengers 288.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 13*, passengers 69.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 20, passengers, Manchester-London, 19, London-Amsterdam, 20.

LONDON—ROTTERDAM:

K.L.M., machines 11, passengers 21.

Total number of trips by British machines: 52, carrying 287 pas. Foreign machines: 41, carrying 130, carrying 130 pas.

STATISTICS.

For week ending April 8:—

Machines, 93; Passengers, 417; Crews, 156; Total Personnel, 573.

Corresponding week last year:—

Machines, 60; Passengers, 137; Crews, 100; Total Personnel, 237.

Corresponding week, 1921:—

Machines, 58; Passengers, 210; Crews, 78; Total Personnel, 288.

Corresponding week, 1920:—

Machines, 36; Passengers, 45; Crews, 40; Personnel, 85.

* These machines also carry loads of freight

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

Croydon is beginning to live up to its name of the "Charing Cross of the Air." On certain days last week about 15.00 hrs. when the incoming machines were due to arrive there have been as many as 20 cars waiting on the tarmac and the scene when all the machines have arrived has been quite like a railway station at holiday-time, if on a smaller scale.

It is the usual thing for four Goliaths crammed full of passengers and freight to arrive together. When one considers that much of this load is booked by Handley Page Transport and owing to lack of machines has to be turned over to the Air Union it is not surprising to see poor Mr. Cogni, the energetic H.P.T. traffic manager, almost weep tears of blood. Under the existing absurd subsidy scheme H.P.T. Ltd. only contract to run 600 trips per year and so any extra machines put on service do not get subsidy. It is time that the Air Ministry altered this state of affairs without delay.

Handley Page G-EBBH has been converted into a fourteen-seater by removing the forward luggage compartment fitting extra windows and putting in two extra seats. She has on several occasions carried her full load.

On Saturday last the Air Union ran seven "Goliaths" all full up to the brim.

Instone's and Daimler's are getting a good share of the passengers on their respective routes. It is expected that the Daimler service to Berlin will be in operation in the course of a week or so.—G. D.

Major Foot Goes West.

Major E. L. Foot the well-known pilot of Handley Page Transport Ltd. leaves that firm on Apr. 18 to take up a position as pilot to the Bristol Aeroplane Company.

Major Foot is generally believed to have been the first pilot who seriously studied the art of aerobatics and it was certainly he who introduced it to Gosport. He can therefore claim to be the real founder of the famous Gosport School.

One well remembers a day in November 1916 seeing an Avro side-slipping down into the aerodrome and seeing everyone turn away so not to see the machine crash when she hit. Therefore most of us missed seeing the machine flatten out and start off again. However when Major Foot repeated the performance again and again we all watched. What a controversy then started as to the advisability of stunting an Avro! One remembers hearing the Flight-Commander in whose charge was Major Foot's machine declaring that he would have to re-rig the Avro after each flight. That was the real beginning of scientific stunting, though Scouts and B.E.s had of course been frequently looped previously and the braver pilots had occasionally got into and out of a spin on purpose.

Major Foot then joined 56 Squadron in which so many other famous pilots served, among them Ball, Mannock and Bishop.

After the war Major Foot joined Handley Page Transport Ltd. and with Major (now Squadron-Leader) W. Sholto Douglas carried out much of the first Commercial Flying.

With the exception of a short break in 1921 he has been with Handley Page Transport ever since.

He is regarded as one of the finest pilots of fast machines in the world and one hears that he is to fly a modified version of the Bristol "Jupiter" monoplane with retractable undercarriage in the races this year.

All will wish Major Foot the very best of luck. Both he and Mrs. Foot will be much missed at Croydon.—C. D.

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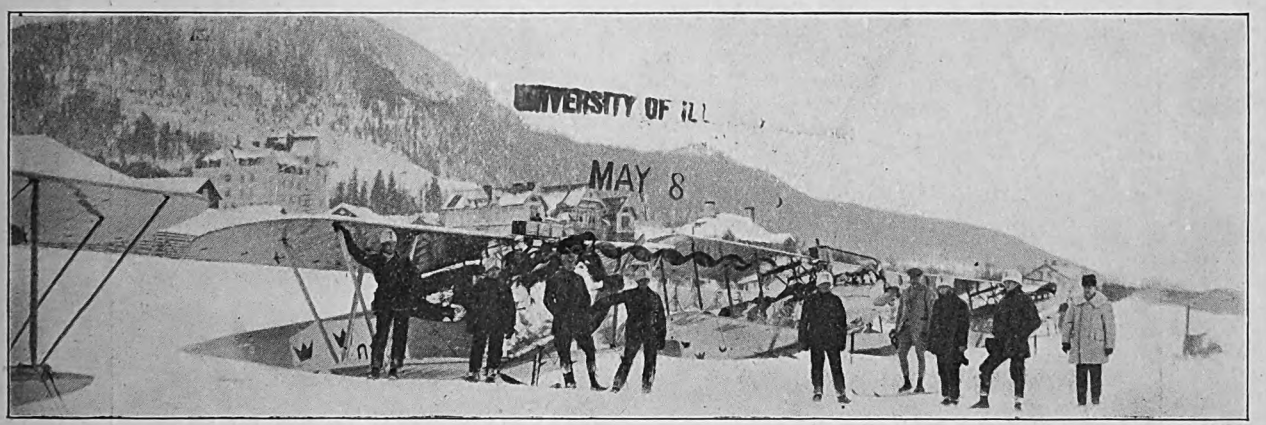
THE AEROPLANE

Edited by C.G. Grey

WEDNESDAY, APRIL 18, 1923.

Vol. XXIV. No. 16. SIXPENCE WEEKLY. [Registered at the G.P.O. as a Newspaper.

ARCTIC CONDITIONS.



IN SWEDEN:—Aviators of the Royal Flying Corps of the Swedish Army with their Austrian "Phönix" biplanes on skis.

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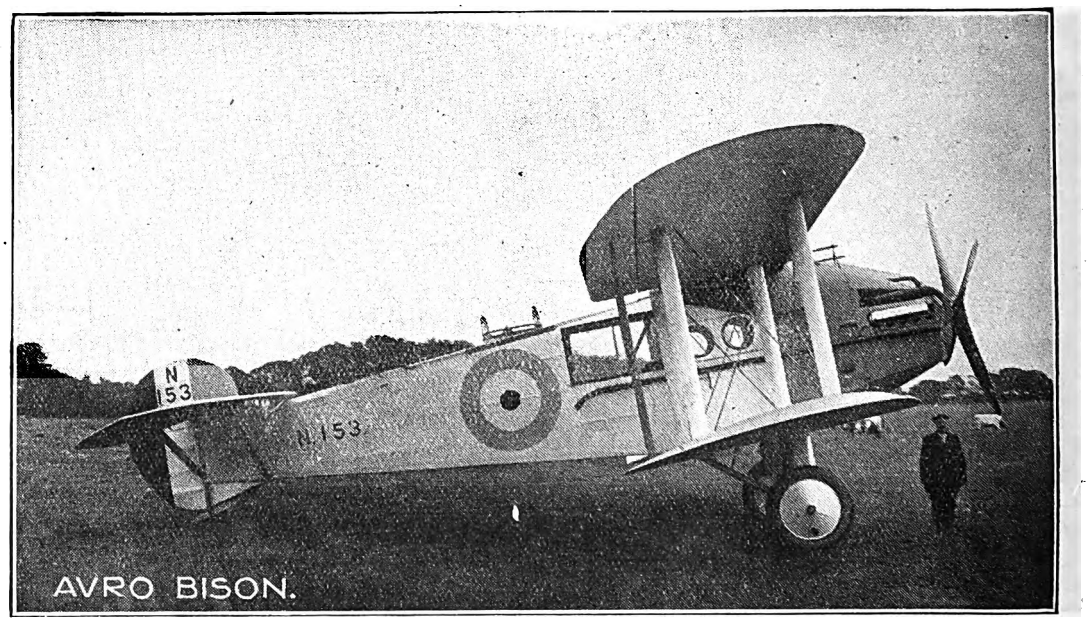

AVRO BISON.

THE illustration shows one of the latest examples of **AVRO** design and construction—the **AVRO BISON**, a Fleet Gunnery Spotter, specially built for the British Air Ministry and fitted with a Napier "Lion" Engine. This machine is equipped for taking off and alighting on a ship's deck.

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ON THE AIRCRAFT TRADE AND AIR POLICY.—II.

A Move for the Worse.

Before turning to the subject of the Trade and the Civil Aviation Policy of the Air Ministry it seems necessary to refer to a matter which one omitted to mention last week in writing on the Technical side of the Air Ministry in its relation to the Trade.

It was then made clear that though there are many very competent officials in the Technical departments and sub-departments there are many also who are incompetent and self-seeking. But on the whole things work fairly well because all are inside the Air Ministry itself where a good Service tone prevails which influences the civilian officials as well as the R.A.F. officers.

Unfortunately certain changes are now being made by which a number of the Technical sub-departments at the Ministry are being transferred to Farnborough so that the personnel who order that certain experiments shall be conducted may be on the spot and see those experiments being done at the Royal Aircraft Establishment. Most people in the trade regard this as a disastrous policy, and personally one cordially agrees with them.

It means that people who at the Air Ministry were acquiring the tone and outlook of the R.A.F. and of the permanent Civil Service will at Farnborough come under the influence of that horrible pseudo-scientific-cum-suburban-polytechnic atmosphere which has always been the curse of the R.A.E. Factory. As the old song said:—"You can't judge the marmalade by the label on the jar," but after all a man's clothes are, in the words of the Catechism, "an outward and visible sign of an inward and spiritual grace" and the permanent Civil Servant's smart black coat, good hat, and neat collar and tie do indicate a mind which is more orderly and workmanlike than that of the official (save the mark) who goes to his department in a ready-made sports coat, badly kneed flannel bags, an unstarched collar, and an uncombed "pompadour" and humbugs himself that he is unconventional when in fact he is merely sloppy in mind and body. And the latter type may be observed at Farnborough during any dinner hour at the Factory running at large in herds like the other wild asses of the desert.

The greater the separation between the Air Ministry's technical officials and those R.A.E. officials who have to work under their instructions the better. Bringing the two so closely together under the new scheme is bound to result in a community of interests in which each will try to cover the other's mistakes and both will combine against the Trade.

Moreover while the Technical people were at the Air Ministry the Trade designers and scientists could run in and see them at frequent intervals and discuss detail work. Thus much valuable time was saved, progress was accelerated, and a friendly spirit was created. Under this new and amazingly stupid scheme if anybody in the Trade wants to see about any little technical point he has to make a sixty-mile journey to discuss it with the minor official in whose particular cubby-hole it belongs.

Thus so far from expediting technical affairs by improving smooth working between the Trade and officialdom, this new scheme will widen the gap between the Trade and the Air Ministry's Technical people. And for that reason it seems utterly fatuous.

A Possible Advantage.

Still, being a firm believer in the Buddhist doctrine that all things work together for good, one can see a certain benefit in the arrangement which the Trade does not seem to have perceived. It is this.—The Supply side of the R.A.F. remains at the Air Ministry and at the finish the comic Research and Technical people have to work on what the R.A.F. Supply branch demands. Therefore if the Trade leaves all the funny little technical fellows to paddle in their own little puddle at Farnborough, and devotes itself to finding out what the Supply branch wants and to supplying it without reference to Farnborough the Trade will be in a much stronger position than it is to-day.

For example suppose an Air Ministry specification comes along for a single-seat fighter with certain required characteristics. A firm might go through all the usual rites of submitting drawings and awaiting the checking of stresses and so forth and so on, and in about 12 or 18 months it might produce the desired experimental machine. But starting at the same time it might build a better machine without any reference to the Farnborough experts and at the end of six months go to the Supply Department and say:—"We are still waiting on Farnborough for approval of drawings and fittings and gadgets, and haven't been able to start work on the machine. But meantime we have built one which fulfils all *your* requirements and a bit over. Perhaps you'll be so good as to come and see it fly."

After that had happened a few times the R.A.F. would soon see that Farnborough was an unnecessary evil, just as the R.N.A.S. saw it in 1914. And the R.A.F. would then begin dealing direct with the Trade.

Strategy and Tactics.

If the R.A.F. refused to buy the "six months" machine, as one might call it, then the firm would be quite at liberty to offer it to any foreign Power for it would not have been produced with Air Ministry technical assistance (or rather interference) as are all experimental machines of to-day and so the R.A.F. would have no hold on it. And nothing would annoy the Air Ministry more than that a foreign Power should have an English fighting aeroplane which was better than its own official machines. In fact no Government would dare to allow such an affair to happen.

It was by very similar strategy that the big armament firms prevented the Navy from developing the dockyards to the extent of building all warships with Government labour. They built better ships for Brazil and Chile and such countries than the Dockyards built or could build for the Royal Navy. And so the Government was forced to buy from the ship-building Trade.

But also—and here come in the eminently respectable English system of graft which has always puzzled the Americans and other nations so terribly—the ship-building firms adopted clever tactics as well as strategy in that they engaged at some little expense dear old post-captains and admirals who could go to the Admiralty and call Sea Lords by their Christian names and they engaged clever young Commanders or two-and-a-half stripers who could make ship-noises which the Technical staff at the Admiralty could understand. These ex-Naval officers made it possible for their firms to get in where other firms were left on the door-mat and when work was in progress they made it possible to get new ideas and improvements and designs past the Technical staff where mere Trade technicians would have been refused a hearing.

One commends to the Aircraft Trade in their dealings with the Air Ministry the study of the strategy and tactics of the big armament firms. Before long our aircraft firms will be in the position of the great ship-building firms—of which some of them are already branches or allied concerns—and history (which one has often remarked is the worst plagiarist in all literature) has a way of repeating itself.

Some aircraft firms have in their employ people who were once on the civilian technical side of the Flying Services. But one cannot recall off-hand any firm which has on its staff anybody who has been of importance on the Service technical side, that is to say anybody who has done consistent war-flying as distinct from those who were civilians in uniform.

After which reflections we may now pass on to the subject of Civil Aviation.

The Trade and Civil Aviation.

Where Civil Aviation is concerned one finds singular unanimity in the Trade up to a point and thereafter considerable divergence of opinions. Naturally we are all agreed that someday somewhere somehow air transport is to be the only worth-while method of locomotion. But at present there is too much some about it.

Some people in the Trade believe in high speeds at all costs (including high landing speeds) and in hanging the

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lives of passengers and the reputation of Civil Aviation on infallible engines. Some people believe in comparatively low travelling speeds so as to have low landing speeds. Some people believe in trusting to the skill and judgment of pilots. Some people believe in perfecting ground organisation by providing frequent and adequate aerodromes and efficient signalling systems.

Personally one believes in all these requirements combined and one is certain that none of them can produce success by itself. Our railways are the best in the World because they combine all these points.

The Air Line and the Railway.

Our trains are the fastest in the World but they *can* crawl into a station or through a fog. They do not have to shut off at a certain point and trust entirely to the driver's judgment of time and distance not to run into the buffer-stops. That is to say he can check his train with his brakes or pull it in under power. And in spite of that accidents still happen on the best railways. Similarly our aeroplanes ought to do their 120 or 150 miles an hour and they ought to be able to fly into an aerodrome under power at 35 to 40 miles an hour and at the finish they ought to be able to parachute down under full control at not more than 20 miles an hour. We have practically reached this point with at least one war machine. But it is not worth anybody's while as yet to build a commercial aeroplane with such qualities despite the fact that they constitute together the most important step of all towards the success of Civil Aviation.

Our engine-drivers are the best in the World because they have to do something like ten of fifteen years training (most of it over one route) before they are trusted with a first-class express. Any driver would ditch his train if he attempted to keep schedule time over such stretches as the Totnes curves or the Miller's Dale ravines or the run from Penrith up and down Shap Fell or the junctions at Crewe or Preston unless he knew to a fraction of a mile per hour how fast he dared to take them and unless he knew every note of his engine and could feel every change in her mood. Few people realise that they trust themselves as absolutely to the skill and experience of an engine-driver as they do to the pilot of an aeroplane, and that an engine-driver needs many more years of experience to become competent than does an aeroplane pilot.

But the engine-driver has the advantage of being able to rely almost implicitly on his signals whereas aeroplane signalling is deficient rather than defective. Thus the engine-driver needs to have the greater experience and the aeroplane pilot needs the greater self-dependence and self-reliance.

Given the adequate aeroplane (which we can have in six months' time if somebody will find the money to build it) and given the skilled and experienced pilots (which we have got nearly enough) and given a proper signalling system (which we can also have within six months if we tackle sufficiently firmly the foreign countries over which our machines fly) we can run our air-lines with something approaching the regularity and safety of an ordinary steamship line even if we cannot aspire to rival our admirable railways. But when we have done that there still remains the question of making any air-line pay its way.

Paying Our Way.

Making an air-line pay its way involves two questions (a) Finding the passengers and freight, (b) reducing running costs so that they can be covered by receipts. In itself (a) involves several separate questions (1) How can passengers be induced to travel by air? (2) How much will they pay for air transport if they can be induced to travel by air? (3) What sorts of goods will stand the cost of air transport and (4) How can senders of such goods be induced to send them by air?

As to (1): It is a matter of persuading people that it is safe to travel by air. As one said some weeks ago, if a cross-Channel service of 50 machines a day each way were put on at Croydon and free passages were offered to everybody it would be impossible to fill the machines. People are accustomed to being killed by falling off horses and by being upset out of carts and by being drowned in boats and by being smashed in railway accidents and by being mashed in motor-cars but they still regard being crashed in an aeroplane as what Peter Pan calls "an awfully big adventure." When it is regarded as merely a dull way of expiring then there will be unlimited passengers for air lines—always provided that the fares are not too high.

As to (2): Time is money and people must expect to pay more for a mode of transport which saves time. But they will not pay 100 per cent. above railway and boat fares for the London-Paris trip. On the other hand in undeveloped countries where an aeroplane may do in an hour what ground or water transport does in a week the price of a man's pay and keep for a week may amount to a paying fare on an aeroplane. Opinion in the Trade is very diverse as to how much the public will pay for air transport so one had better leave the subject till one comes to discuss various individual opinions which have been received for publication.

Goods Traffic.

As to (3): Not many species of goods will stand air transport freight-rates. And apparently none of the necessities of life will stand them. Bread, beef, butter and beer will not bear an increase of threepence or more per pound weight to pay for rapid transit: their selling price is too low. On the other hand frocks and frills and furbelows—which after all play so large a part in making life worth living as to be classable among the necessities of life—are very light in proportion to their price (in spite of the increased length of skirts) and so will stand an additional shilling or so per pound weight for quick delivery.

But there are many who believe that the most promising freight for air transport are financial documents, share scripts, bankers' drafts (one believes that these are not related to over-drafts which from experience one judges are never very heavy), bearer bonds and such things, most of which are not familiar to the majority of the readers of this paper who in the main have been concerned with aviation for so long as to have no knowledge of money matters. Also there are many who believe that the first success of air lines should be built up by running successful mail services. Certainly the Cairo-Baghdad route and the trans-Continental mail service in the United States have done more to convince people of the permanent value of air lines than any other form of air transport. And so one is inclined to agree with this last view. Mr. Chessborough J. Mackenzie Kennedy's "Air Post of Banks" may have been as great a failure as his super-Sikorski multiple-engined biplane which has lately ceased to be a landmark at Northolt but the underlying idea in each may well be equally sound.

As to (4): This is purely a business proposition. It is a matter of advertising the air-lines in the right way to the right people instead of broadcasting haphazard advertisements to the general public of whom 99 per cent. have no more use for the air lines than they have for THE AEROPLANE newspaper. ("Thank Heaven" said he with fervour "for how should we pay for the extra paper and printing?") If and when air-lines or an air-line are or is put on a proper business basis the first requirement will be people with knowledge of ordinary commercial or shop-keeping transport work to act as traffic-managers. And they will not be found in the Aircraft trade, so far as one knows it.

Which brings us naturally to the question of the proposed £1,000,000 Air Transport Monopoly Company.

The Million-Pound Monopoly Company.

On no subject has the Trade so many diverse views as on this. The one thing about it which gives one an inclination to think that after all it may be the right thing is that though most people approve of something about it everybody disapproves of something or other else and where there is such unanimous disagreement it almost seems that the scheme must be sound.

One objection which has been raised to it in various quarters deserves very serious consideration by the Air Ministry. It is very simply this:—If the Monopoly Company (as it is generally called) is to be an efficient air transport undertaking it must necessarily be the worst possible thing for the aircraft constructors as a whole.

What it means is that to run efficiently the Monopoly Company must standardise. That is to say it must decide at the start on one type of aeroplane and one type of engine and stick to them. One firm's aeroplane and one firm's engine must be chosen. Those firms will benefit and the rest of the Trade will not be the better by one penny from the expenditure of a million pounds of the tax-payer's money.

The highly efficient Daimler Airway has shown that the life of an aeroplane on a properly organised air line can be prolonged indefinitely. Therefore there will be no chance of improvement even by the makers of the chosen machines.

Look at the London General Omnibus Company. Barring alterations in body-work it has not altered its chassis design in ten or twelve years. It is only recently that the sudden advent of the much more comfortable non-jerking petrol-electric 'buses has shown us how much very real discomfort we have endured for years thanks to monopoly and standardisation while ordinary competitive motor-cars have been constantly improving.

And as the subsidy will make it impossible for other lines to start in opposition to the Monopoly Company the whole progress of technical improvement in Civil Aviation will be retarded. Which only shows the truth of Mr A. W. Baskomb's statement that "Behind the silver lining there are darker clouds ahead," and confirms one's belief that as competition is good for trade a monopoly is the worst thing possible.

A Wider Outlook.

Now if the Treasury had a wider outlook—and as a witty R.A.F. officer remarked recently "Treasuries do not think

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Imperially "—the Government might have done much better by offering a subsidy on a competitive basis, which could be evolved without much difficulty. If the existing air-lines plus some others could be offered subsidies which would show them a profit if they ran efficiently and a loss if they ran inefficiently then we should see some progress.

The different lines would compete with one another to get aeroplanes which would carry big loads with low power and to get engines which would give more power for less fuel and would need less overhauling and adjusting. They would demand low getting-off and landing speeds and high flying speeds, which would mean variable wings and variable air-screws. And so rapid progress would be assured and the brainier aircraft constructors would get the business.

We have been told that the Monopoly Company is to be formed so that British subsidised Aviation may compete against French subsidised Aviation, and that under the subsidy scheme which existed last year the subsidy only helped each British air-line to compete against the two others. Many people in the Trade, with whom one agrees personally, think that internal competition which produces progress is preferable to international competition which produces stagnation in design.

We can never compete with France in the number of machines running so long as the French Government pays extravagant subsidies out of the money which is owing to us for war loans. But if we have internal competition we shall soon produce aeroplanes which will pay their way without any subsidies, and then our superior construction, organisation, and maintenance will capture the World's trade just as we captured the World's shipping trade. Nobody travels in a French steamer if an English one is available.

The Need for Progress.

Therefore the one thing we want is progress in design, which brings us to question (b), mentioned ever so far back,—"Reducing running costs so that they can be covered by receipts."

This is a matter of research and experiment, and if the Monopoly Company is to be an efficient operating concern it cannot indulge in research. And if one of the conditions of the subsidy is that it must do research work then almost certainly that research work will be done either in a Government establishment such as the R.A.E. or by the firms which have secured the monopoly for the supply of aeroplanes and engines to the Monopoly Company. Which is just as bad as compared with free competition between several firms.

The matter of research is mentioned in a characteristically witty and commonsensible letter by Lt.-Col. Mervyn O'Gorman—one's erstwhile enemy but one hopes one's present and future good friend—whose views on technical subjects are invariably worth having. He writes:—

"Sir,—The new scheme for rescuing Civil Flying from the Slough of Despond reflects great credit upon Sir Samuel Hoare. He wanted financial advice so he went to people who had it and since the credit for a good piece of team work redounds to him who selected the team I congratulate him as well for his choice as for having avoided other sources of advice to his hand.

"Incidentally the proposal shows signs of political astuteness. As you rightly say it looks like a loan, but works like a subsidy. Moreover it is to energise a financial whale while being but a sprat. Also it is not so small a sprat but that it will afford some nourishment to the whale. Its heart can beat with currency.

"For the completion of the scheme there is need of something more, if it is too mediæval to talk of the *soul* let us say the stomach.

"The passengers who are to be induced to fly, ardently as they desire to pay fares in redemption of the loan, are still more urgent to be safe. The starting of more air lines doesn't make them safer.

"No doubt new aircraft will be ordered and paid for on this scheme but how will it differ from the old? How is it to be endowed with those qualities, the lack of which kept the old aircraft so empty in despite of the lure offered by the truly astonishing merits of aerial travel? By research.

"Has our Minister any stomach for research? That is the question. Is he determined to expedite, to make sacrifices to expedite, the investigation of the *natural laws* we are concerned with or is he not? Does he believe the high people about him who tell him that 'They have all the necessary technical knowledge in their blood'? Does he believe that the ordering of a novel aeroplane is *research* and a suitable channel for the outpouring of research monies?

"If, as I believe he means to do, he will insist on having genuine scientific research pushed on *pari passu* with his new scheme for civil aviation there is quite a good future for us all, aye, even for one so severe on 'mere theorists' as once was the Editor of The Aeroplane.

"I am, with thanks for your invitation to write this note, Yours sincerely, "(Signed) Mervyn O'Gorman."

With that letter, which it is hoped will give the Air Ministry to think, if not furiously at least deeply, one proposes to adjourn the present debate till next week, when—all being well—one proposes to publish autonymously and anonymously the views of various people in the trade whose views are worth having.—C. G. G.

THE DUKE'S PRIZE.

It seems a curious and regrettable fact that if the or a committee of the Royal Aero Club can spoil a good piece of work by sheer lack of wit it almost invariably does so. The last Schneider Trophy Race in England was a fiasco and the next one is to be spoiled by holding it at Cowes—the most inconvenient place in British Territorial Waters. Now the competition for the Duke of Sutherland's £500 prize is being disfigured by labelling it a "Motor Glider Competition" when in fact it is a competition for "Light Aeroplanes."

The machines which are qualified to compete for the Duke's Prize are simply low-powered aeroplanes and bear precisely the same relation to a big aeroplane that a light car does to a big car. The division between the two classes is a purely arbitrary one of engine-capacity.

The term "Motor Glider" is as wrong as can be. It is in fact a contradiction in itself. A "Glider" is essentially an aeroplane without an engine. Nothing does or can distinguish it from an ordinary aeroplane except the absence of an engine. When an engine is fitted it ceases to be a glider. In almost all aeroplane factories the term "glider weight" of an aeroplane is used to express the weight of the complete machine "less engine."

It is to be hoped that in the interests of common sense and its own reputation the Royal Aero Club will alter the title of the competition for the Duke's Prize to "The Light Aeroplane Competition." Meantime, the official notification of the conditions for the competition reads as follows:—

MOTOR GLIDER COMPETITION.

The Royal Aero Club will organise in September next a Motor Glider Competition, open to machines fitted with engines, the total cylinder capacity of which must not exceed 750 c.c.

It is proposed that the starts should be made off a hill and a triangular course of not less than 15 miles with a range of hills on one side will be used.

One gallon of petrol only will be allowed and the weight of the pilot must be made up to a minimum of 168 lbs.

In addition to the actual flying the question of transport will be considered and competitors will be required to demonstrate that the machine is capable of being transported a distance of one mile by two persons without the use of extraneous tackle, in a period not exceeding three hours. The selected course for this test will include getting out of a field through an ordinary gateway and proceeding along a country road.

The competition will probably extend over a week early in September.

The Duke of Sutherland, Under-Secretary of State for Air, has given a prize of £500, through the Royal Aero Club, for the longest flight in this competition (minimum 50 miles) and other prizes will be forthcoming.

In addition to the Motor Gliders, competitions will be arranged for Gliders without engines on somewhat the same lines as those held at Itford Hill in October last.

Advantage will be taken of the facilities offered by the Royal Aero Club by certain competitors to make attempts for the Selfridge Gliding Prize of £1,000.

THE R.A.F. CLUB V. THE H.A.C.

One result of the cricket week at Eastbourne has been a large number of challenges to the R.A.F. Club from first-class amateur sides all over the country. As an experiment the Committee has accepted that of the Honourable Artillery Company, and a match between members of the R.A.F. Club and the H.A.C. has been fixed to be played on the ground of the latter, Armoury House, Finsbury Pavement, E.C.2, on Saturday, June 2, beginning at 12 noon.

The H.A.C. have sportingly stated that a sum of money will be handed to St. Dunstan's as a result of the match (no "gate" being charged) and they probably hope for a representative "Eastbourne" side. Unfortunately the date they have selected clashes with fixtures at Lord's and Leyton. Surrey, Middlesex and Essex are all engaged so some of the county amateurs who might have assisted the R.A.F. will not be available. The Hon. Secretary of the R.A.F.C. Cricket Committee, Capt. M. G. Kiddy, will be very pleased to hear from members of the Club who would like a game. Telephone, Victoria 2112. Address the Club.

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R.A.F. INTELLIGENCE.

Appointments.

Air Ministry, week ending Apr. 7, 1923.

General Duties Branch.—Wing/Cmdr. H. L. Reilly, D.S.O., to No. 4 F.T.S., Egypt, 6/4, to command.

F/Lts. H. S. P. Walmsley, M.C., D.F.C., to I.A.A.D., Henlow, 13/4; R. H. C. Usher, M.C., A.F.C., to R.A.F Depot, 16/4; G. T. Richardson, to School of Photography, S. Farnborough, for course of instruction, 23/4, G. M. Bryer, A.F.C., to R.A.F. Base, Gosport, 4/4; E. F. Turner, to H.Q., Coastal Area, 3/4; C. V. A. Bucknall, to R.A.F. Depot, 1/5; A. T. Williams, to H.Q., R.A.F., Middle East, Egypt, 4/3; R. C. Hardstaff, to No. 70 Sqdn., Iraq, 5/3; N. B. Ward, to 216 Sqdn., Egypt, 23/3; G. H. Reid, D.F.C., to I.A.A.D., Henlow, 9/4.

F. and O. Officers.—T. Humble, to No. 12 Sqdn., Northolt, 16/4; C. H. F. Nesbit, to School of Army Co-operation, Old Sarum, 11/4; W. H. Jinman, to H.Q., Coastal Area, 16/4; A. Hesketh, D.F.C., to R.A.F. Base, Calshot, 11/4; H. E. F. Saunders and H. J. Collins, to No. 100 Sqdn., Spittlegate, 4/4; C. A. Ravn, E. C. Delamain, M.C., and W. H. Dunton, to School of Photography, S Farnborough, 23/4, for course of instruction; S. C Black, M.M., to No. 12 Sqdn., Northolt, 11/4; D. M. Fleming to No. 32 Sqdn., Kenley, 18/4; B. H. C. Russell, to No. 5 Sqdn., India, 10/2; T. B. Bruce, M.C., to No. 8 Sqdn., Iraq, 14/3; A. A. C. Hyde, to School of Photography, S. Farnborough, 23/4, for course of instruction; M. W. J. Boxall, D. C. H. Ferguson, A. E. G. Forrest, W. F. R Gough, H. T. Herring, R. Iacques, A. N. Macneal, R. H. Stewart Peter, and R Kennedy, to No 100 Sqdn., Spittlegate, 4/4, for course of instruction

P/Os. H. S. C. Bassett, L. B. Hirsh, P. J. A. Hume Wright, G. Wake and J. B. Rose, to R.A.F. Base, Gosport, 9/4; A E. B. Bateman, S. H. G. Trower, M. Wiblin, J. B. Wilson, and L. Young, to C.F.S., Upavon, 9/4; A. F. Scroggs, to R.A.F. Base, Gosport, 18/4; A. W. B. Walker, to No. 100 Sqdn., Spittlegate, 9/4; L. G. A. Kirchner, to R.A.F. Base, Calshot, 9/4.

Medical Branch.—S/Ldr. (Medical) J. H. Porter, M.C., M.B., to Basrah Combined Hospital, Iraq, 13/1.

F/Lts. (Medical) D. G. Boddie, M.B., to Basrah Combined Hospital, Iraq, 13/1; T. J. Thomas, M.B., to 84 Sqdn., Iraq, 28/1; R. J. Aherne, M.C., to Station Commandant, Iraq, 31/1; R G. J. McCullagh and J Prendergast, M.B., B.A., to Basrah Combined Hospital, Iraq, 6/1 and 19/2; C. A. Meaden, to Research Laboratory and M.O.S. of I., Hampstead, 3/4.

F/Lts. (Dental) D. H. Williamson, to Baghdad Combined Hospital, Iraq, 13/1; H. J. Higgins, to Basrah Combined Hospital, Iraq, 13/1.

F/Os. (Medical) E. D. Gray, M.B., M.A., to Basrah Combined Hospital, Iraq, 13/1; G. Kinneir, to Basrah Combined Hospital, Iraq, 14/2.

Stores and Accountants Branch.—F/Lts. (Stores) A. E Sutton-Jones, to Stores Depot, Iraq, 14/9.

F/Os. (Stores) W. H. Bowden, to Stores Depot, Egypt, 4/3; F. W. Todd, to No. 5 Sqdn., India, 12/3; C. W. Rugg, to No. 60 Sqdn., India, 1/4.

F/Os. (Accountants) B E. Hume-Wright, to No. 2 F.T.S., Duxford, 16/4; J. J. Mardon, to Record Office, Ruislip, 26/3

R.A.F. Memorial Prize Winners, 1922.

The current issue of the Air Force List shows the 1922 winners of the various R.A.F. Memorial prizes. The "Gordon-Shephard" Memorial Essay Prize. First prizes :—S/Ldr. W. Sholto Douglas, M.C., D.F.C., and F/Lt. C. J. S. Dearlove. Second prizes :—Air/Cmdre. C. R. Samson, C.M.G., D.S.O., A.F.C., and S/Ldr. A. A. Walser, M.C., D.F.C.

The "R. M. Groves" Memorial Essay Prize. First prize :—S/Ldr. A. A. Walser, M.C., D.F.C. Second prize :—S/Ldr. B. E. Smythies, D.F.C. Third Prize :—Wing. Cdr. J. T. Babington, D.S.O. (Also winner of the special prize.)

The "Dunning" Memorial Cup. F/Lt. G. M. Bryer, A.F.C.

The R.A.F. Reserve Overseas.

In connection with the Royal Air Force Reserve of Officers one has received several letters from ex-R.A.F. officers abroad who would like to join the Reserve but who necessarily cannot do the required training where they are at present and would only have a chance of doing the said training perhaps once in three or four years when home on leave. One gathers that provision is actually made in the scheme, though not in operation at the moment, for the enrolment in the Reserve of former officers who are normally abroad. It is even possible that if sufficient applications to join the Reserve should be received from certain limited areas something might be done to provide training locally.

One assumes that it would be quite easy to make arrangements with the Royal Australian Air Force to provide practice facilities for ex-R.A.F. officers in Australia, though it seems more likely that the R.A.A.F. would include such officers in a Reserve scheme of its own. Similarly one imagines that the Canadian Air Force would absorb into its own Reserve scheme any un-Canadian aviators who happen to be in Canada. There are however scattered British communities where there are numbers of aviators and apparently no possibility for training.

For example personally one knows of several in Hongkong—enough at any rate to raise an annual R.A.F. Dinner there, and there are several in the Malay Straits and Burma on rubber and tobacco work. If the Navy establishes a big base at Singapore it is to be assumed that there will also be an R.A.F. base there for fleet co-operation in the Far East. In that case it might be possible to arrange a kind of annual holiday at Singapore for Far Eastern aviators during which they could do their training together.

People in India of course could quite easily be given practice training at R.A.F. stations. There must also be many ex-R.A.F. officers in the Argentine Republic and possibly some arrangements might be made with the River Plate Aviation Company to give them practice flying.

One has no official information on this subject but one would strongly advise any readers of this paper abroad who would like to have the honour of being still officially attached to the Royal Air Force as officers of the Reserve to write to the Secretary, the Air Ministry, Kingsway, London, W.C.2, expressing their desire to join the Reserve. Such letters will certainly reach the right people and if there should be a sufficiency of them one is quite sure that the Air Staff will see to it that such sporting offers are not ignored.—C. G. G.

In Memoriam.

The Turnberry War Memorial in memory of the Members of the Royal Air Force who gave their lives for King and Country while training in the Turnberry School of Aerial Gunnery will be unveiled by the Most Honourable the Marquess of Ailsa, Lord Lieutenant of Ayrshire, on Saturday, Apr. 28, 1923, at 3 p.m.

A cordial invitation to be present is extended to Relatives and Friends and all others interested.

Uniform: Members of Lieutenancy, Field Service Dress; Serving Officers (Army and Navy), Field Service Dress; Ex-Service Officers and other ranks, optional

The Baghdad Air Mail.

Relatives of Service people in Iraq have been somewhat grieved during the past few weeks because air-mail letters which should normally be delivered in London on a Monday have been arriving three or four or five days later. These letters instead of coming by the regular P. and O. steamer have apparently wandered across the Mediterranean from Egypt on some Italian packet which ultimately arrives at Trieste. The matter was brought to the attention of Sir William Joynson Hicks, our new Postmaster-General, who has always been a strong supporter of aviation in general and air-mail work in particular, and as the result of prompt communication between the G.P.O. and the Air Staff matters are being adjusted so as to expedite the service.

Apparently under the existing arrangements aeroplanes carrying the air mails leave Baghdad on alternate Fridays and normally reach Cairo in time to be forwarded by the P. and O. steamer leaving Port Said as a rule three days later, that is to say on a Monday. Unfortunately four air-mails in succession during March and the beginning of April took between three and six days between Baghdad and Cairo. Thus they arrived too late to catch the P. and O. boat and were forwarded by the intermediate boat via Trieste. It seems that if they had been kept back for the P. and O. steamer the following Monday they would have in each instance reached London several days later than they did.

It is believed that the probable arrangement will be to start the mail machine from Baghdad on a Thursday instead of a Friday so as to allow an extra day for the connection at Port Said.

One suggests to the Air Ministry that it would be interesting to have some sort of an official statement as to why it is necessary to allow so much as three days for the air-mails to travel from Baghdad to Cairo. Some sort of a record of the cause of delays would undoubtedly be of very great interest to all who are concerned with aviation, whether as manufacturers of aeroplanes and engines or as operators of air lines or merely as people who are interested in the development of aviation.

Purely as a matter of distance it ought to be possible to fly from Baghdad to Cairo in twelve hours. And even in the Winter when the days are shorter it ought to be possible to leave Baghdad one morning early and be in Cairo by midday next day. That is of course if the organisation is anything like so good as that of the Daimler Airway. It would be a far better demonstration of the possibilities of air-mail work to get the mail machines through in twelve hours on a dozen occasions and then on the thirteenth occasion to be held up for a couple of days by bad weather than to do what appears to be the present custom namely to allow three days for a one-day journey because the weather may be bad.

Also one cannot quite see why the Baghdad mail should be confined to a service of once a fortnight. After all it is run by the R.A.F. so the men and the machines and the sheds are there whether the mail machine runs once a fortnight or once a day. Whether it runs more often or not seems to be purely a matter of petrol. Surely our paternal Government could afford a few gallons of petrol extra for mail machines to leave Baghdad every Sunday so as to catch the weekly P. and O. boat instead of doing so only once a fortnight.—C. G. G.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The application of the theory of vortices to the case of biplane wings and to the effect of the proximity to a wing of solid boundaries, such as the surface of the earth when an aeroplane is taking-off or landing, or of the walls of a wind-tunnel in which a model is tested, is described below.

It is believed that the account so far given will be sufficient to show that the theory, despite its neglect of the effects of viscosity, is capable of explaining a number of hitherto puzzling phenomena in a fairly clear manner, and that it produces results of practical value.

An account of the prizes for soaring and low-powered flight which are on offer in Germany is given in this issue. It will be seen that unless political disturbances intervene German activities in this direction are likely to be well maintained during the coming summer.

VORTICISM IN AERONAUTICS.—V.

By W. H. Sayers.

The Biplane.

Very similar methods to those outlined above for the determination of the effect of aspect ratio have been applied to a number of other problems. In the case of the monoplane, the vortex system trailing from the wing-tips disturbs the air-stream at the wing itself. If a second wing is introduced into the same air-stream, disturbances caused by the vortices of the first wing react on the second, and the vortices of the second wing similarly react on the first.

Fig. 21 is identical with Fig. 16, except that a second lifting line, or wing CD, parallel to AB is introduced below AB. Obviously CD is under the influence of a downward current due to the vortices of AB as well as that due to its own system of vortices. In precisely the same way the vortices caused by CD increase the downwash at AB.

In the biplane case there is another effect due to the circulation round the wings. In Fig. 22 the two wings of the biplane A and B are represented diagrammatically as lifting lines together with the circulation round each. It is obvious that the circulation round the lower wing increases the stream velocity above it—that is round the upper wing—while the circulation round the upper wing decreases the stream velocity at the lower wing.

Fig. 23 illustrates the case of a staggered biplane. Here it will be seen that in addition to the effects already mentioned the circulation round B creates an upward component of velocity at A and so adds to its incidence and therefore lift, as well as increasing the stream velocity.

The circulation round A on the other hand produces a downward velocity at B and decreases the lift.

If the stagger is reversed it can easily be seen that the upper wing is in a downwash due to the lower wing, and the lower wing works in an upwash due to the upper wing.

It is obvious that with variations in the gap and the stagger the general problem of biplane interference is somewhat complicated, but the general effect is fairly clear.

The primary effect of combining two wings to form a biplane is that due to the downwash caused by the trailing vortices, and the effect of this is to increase the angle of incidence necessary to produce on each wing the same lift as would be produced by each wing alone. This increased incidence leads as already explained to an increase in the induced drag of each wing.

The secondary effects, due to the influence of the circulation round the wing are the increase of stream velocity at the upper wing and the decrease of the velocity at the lower wing causing an increased lift on the top and a decreased lift on the bottom wing.

There is also the tertiary effect of stagger, which is to increase the lift of the forward wing, and to decrease that of the lower wing as a result of the vertical components of velocity due to circulation.

Qualitatively all these effects are known to occur experimentally, but accurate calculation of biplane effects from the theory for practical cases is extremely complex.

By making certain assumptions of a simplifying nature however it is possible to arrive at results of a quite useful nature.

The minimum induced drag of a biplane—or of a multiplane for any given span—is obtained when all the wings are of the maximum span, and all carry the same load. It is also necessary that as in the monoplane the distribution of lift should be such as to produce a uniform downwash all along the span. In order that both wings—or all wings in the multiplane—shall carry equal loads there must be a change of incidence of the lower wing relatively to the upper to compensate for the difference of lift caused by the secondary and tertiary interferences already mentioned.

With equal lift on the two wings, the increased drag on the top wing due to interference from the bottom wing is equal to the increased drag on the bottom wing due to the interference of the upper wing.

Under these conditions the biplane becomes the equivalent of a monoplane of greater span, but carrying the same total

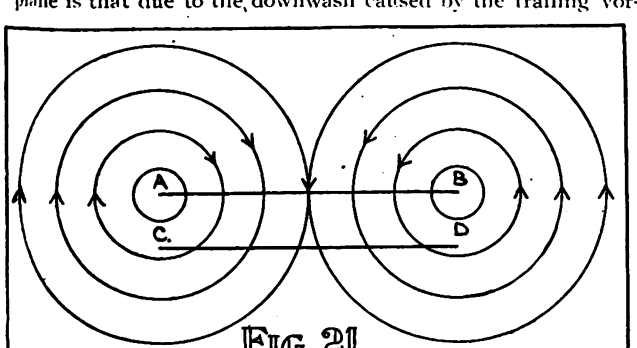

Fig. 21.

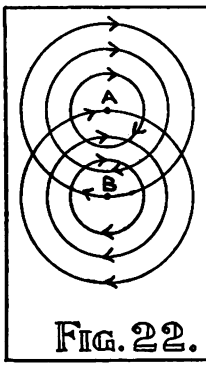

Fig. 22.

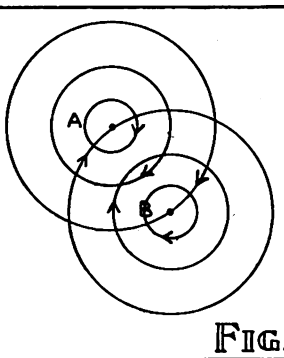

Fig. 23.

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load, and the induced drag of the biplane can be calculated as that of the monoplane of this equivalent span.

The biplane, under these conditions has a less "induced" drag than has a monoplane of the same span. This sounds at first rather like a contradiction of the known higher efficiency of the monoplane, but if it is remembered that to produce the same lift at the same speed, the area of both monoplane and biplane would have to be approximately equal, and that therefore on the same span the monoplane would have only about one-half the aspect ratio of each wing of the biplane, it will be seen that there is no contradiction.

The assumed condition of equal lift over all wings is not realised—and not realisable—in practice. Neither is the best distribution of lift. Nevertheless it is held that relatively large changes in these conditions make comparatively small changes in the total induced drag.

That being the case the effects of biplane interference can be regarded as equivalent to those caused by variation in the aspect ratio of a monoplane carrying the same load.

That is to say, a biplane of a real aspect ratio n is regarded as replaced by a monoplane of aspect ratio Kn, where K is a constant for each particular biplane arrangement. When the gap is zero, K is 1—that is the biplane becomes a monoplane. When the gap becomes very great relatively to the span $K = \sqrt{2}$.

The value of K depends only on the ratio of gap to span, and for practical limits of gap it does not vary very greatly from 1.1. The theoretical values of K for varying gap-span ratios have been calculated and compared to those obtained from model tests. Owing to the fact that a real biplane does not conform to the theoretical best distribution of lift, the real value of K is always less than the theoretical, but the difference is only of the order of 5 per cent. for the range used in actual practice.

The problem of biplane corrections has been worked out, and the results tabulated in a form whereby the characteristics of any biplane may be estimated from the test figures of model monoplanes by Dr. Max Munk in one of the reports published by the American Advisory Committee.*

The method is that outlined above of assigning an equivalent aspect ratio to a biplane combination. This gives the corrected drag and the corrected angle of incidence of the complete biplane, but does not give the changed distribution of lift as between upper and lower wings.

Dr. Munk in the same report gives a method of computing the centre of pressure of the biplane from the known C.P. of the monoplane.

These results have not received the same degree of accurate confirmation by experiment as have the results of the calculation of aspect ratio, but they are pretty certainly in reasonably close agreement with the facts.

The Effect of Boundaries.

When an aerofoil is producing lift in a restricted air-stream —as for instance when an aeroplane is flying close to the ground—the air disturbance set up is obviously affected by the boundary.

If A is an aerofoil close to the ground (Fig. 24) the circulation flow round it cannot continue past the boundary. All flow quite close to the boundary must be parallel to the ground. That is at the boundary all vertical velocities are neutralised. That is to say that in effect the ground produces vertical velocities at every point equal and opposite to those caused by the aerofoil.

The same effect would be produced if an inverted aerofoil B (Fig. 25) were at work underneath the original one, at a distance equal to twice the ground distance.

This applies generally to all forms of vortex motion near a boundary to the fluid. They behave exactly as though the boundary were a mirror reflecting an image of themselves, and as if that image produced the same air disturbance as a real vortex.

The effects can be calculated in the same way as in the biplane case, the only difference being that all the effects are in the opposite direction. The real wing A works in an upwash caused by the image B. This decreases the angle of incidence needed to produce a given lift, and reduces the drag. Secondary effects similar to those of the biplane case also occur. The image B reduces the velocity at A, and so slightly decreases the lift, but the net effect is to increase the L/D ratio.

A similar effect occurs when a model is tested in the wind-tunnel. Here the floor—or rather as models are usually tested upside down, the roof—of the tunnel produces the same effect as the ground in the case mentioned.

The floor produces another image on the other side. In addition the two side-walls produce further side images. The general total effect is to improve the apparent performance of the model by straightening out the air-stream round it—

* General Biplane Theory. American Advisory Committee for Aeronautics Report No. 151.

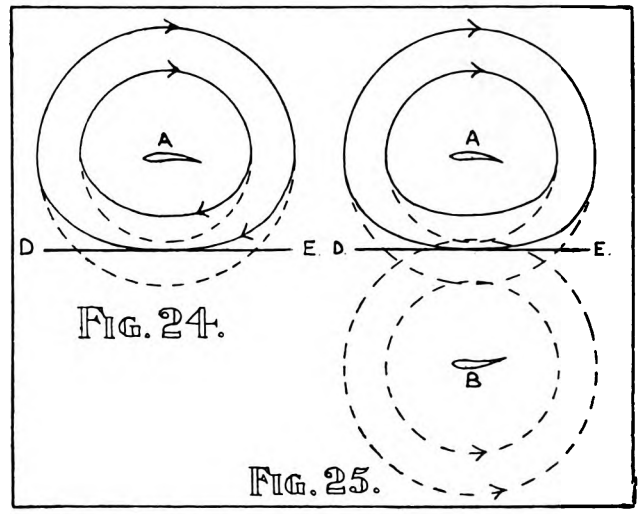

Fig. 24.

Fig. 25.

thus models in the wind-tunnel behave as though they had an increased aspect ratio—that is the drag is too low.

When the "tunnel" is of the type most usual on the Continent—that is when the models are tested in a free jet of air without material tunnel walls—the surface of the jet also behaves as a mirror, but it is a sort of reversed mirror—the aerofoil is not turned upside down, but is reflected as the same way up. In this case the drag is increased.

This correction may be quite important. In a circular tunnel, if the span of the model is one-half the diameter of the tunnel, the decrease of drag is about one-eighth of the induced drag of the model. Fortunately this correction varies very rapidly as the size of the tunnel is increased—so that the majority of uncorrected model tests may be used without serious error.

(To be continued)

GERMAN GLIDING CONTESTS FOR 1923.

The world at large having taken up gliding, the German gliding associations seem likely to display even more than usual activity during the present year.

The annual Rhön competition will take place this year during August and is to be divided into two sections, one for pilots who have not won any prize in the previous Rhön contests and the other open to all. In this section no prizes at all are to be offered for duration flights, all being awarded either for distance travelled or for specified performances other than duration.

By the restriction of one section to pilots who have never previously won a prize it is hoped to encourage new entries and to stimulate gliding amongst a wider circle than that of the habitual entrants. The total abolition of mere duration contests is an obviously sound policy—which it is to be hoped will be followed generally for the future.

In addition to prizes offered specifically for contest at the Rhön meeting there are many others—some of which may be competed for during the Rhön meeting but which are not confined thereto. There is some tendency towards decentralisation apparent which is obviously advantageous in giving opportunities to competitors to whom the Wasserkuppe may not be conveniently accessible. On the other hand it is felt that there is a great advantage in conducting as many tests and contests as possible at the established centre of the sport as thereby there is a greater intercommunication of results and a more extended experience is possible.

These contests may be classified according to their purpose as those intended to encourage progress in soaring, particularly in regard to distance flights, those intended to popularise gliding over a more extensive circle, and those intended to encourage either actual low-powered aeroplanes or of engines suitable for such machines. There are also some prizes offered for designs alone for gliders or low-powered machines. Of the prizes open for competition not necessarily confined to the official Rhön meeting the following are among the most important.

The "Rhemag" competition offers prizes of 400,000 and 200,000 marks for the best designs for engines of 20 h.p. suitable for low-powered aircraft. Cheap construction and reliability are to be encouraged rather than minimum weight.

The Paul-Koechl Prize of 150,000 marks is offered for the best design for a single-seater school glider with normal-type controls. It is stated that the prize is less than the inevitable cost of the drawings which must be provided—and this must equally be true in the case of the engine-design competition.

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VICKERS LIMITED

Vickers "Vanguard."

The above illustration shows a Vickers "Vanguard" (23 Passenger) Aeroplane fitted with two Napier "Lion" Engines.

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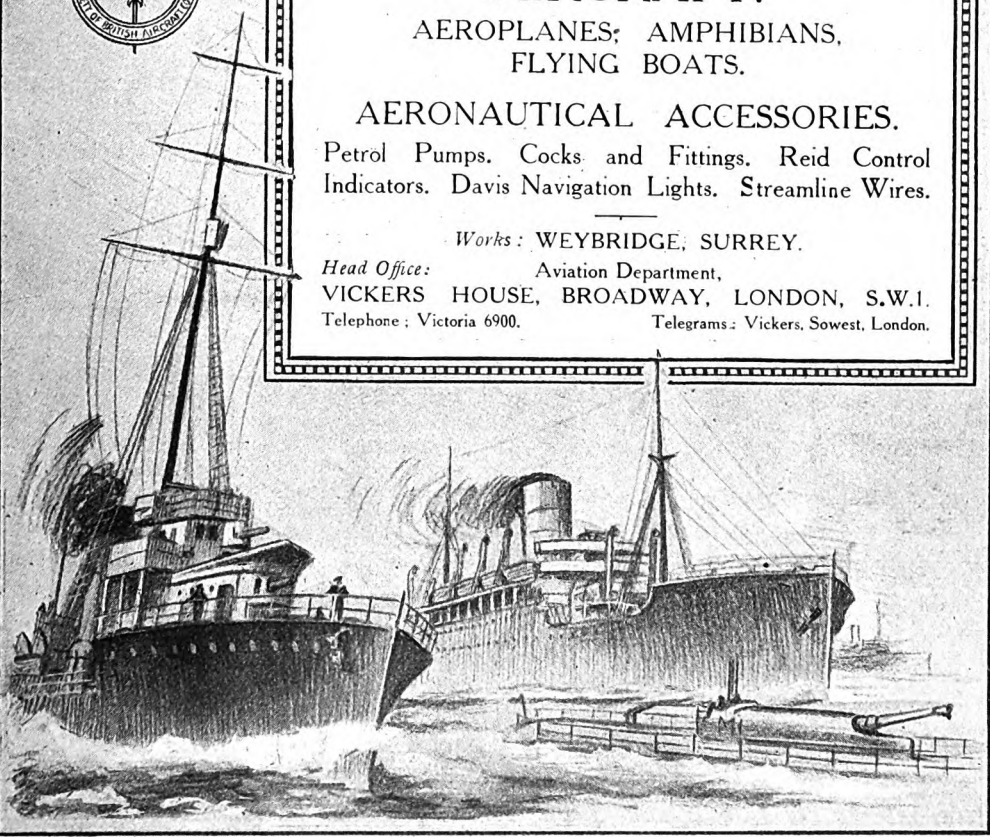

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The Tiedemann prizes, amounting to $500 are the gift of H. Tiedemann of Montevideo, and are split up under various categories at the discretion of the German Aero Club. $100 each are offered for the greatest duration (1) anywhere in Germany, and (2) close to Berlin. $50 each are offered for the 2nd best duration under each of those conditions. $50 is offered for the greatest distance flight anywhere and $50 for the greatest total distance flown on a course in the form of an equilateral triangle. The remaining $50 is to be divided up amongst pilots who receive their soaring certificates before Aug. 1, 1923. All these prizes must be won on home-made machines—not factory-built that is—by pilots who have not flown outside of Germany.

Scadta Prizes. The Scadta (the German company which operates air lines in Colombia) have presented $200 to the Aero Club. This is to be expended in presenting a prize of $100 for the greatest progress made in soaring in 1923 and in buying a sporting glider for the Aero Club itself.

Statax Prize. The Statax Works at Cologne offer 100,000 marks for the best flight round a triangular course of 45 km. per side made on a German machine with a German auxiliary engine. As a qualification competing machines must make a pure soaring flight of not less than 10 min. duration. Minimum fuel consumption will be the determining factor in this competition.

"Deutsch-Chilienische" Prize. 100,000 marks subscribed by Germans in Chili will be awarded for the longest duration flight made over level ground at the Hamburg Fuhlsbüttel aerodrome.

"Radioapparate Gesellschaft" Prize. This firm offers 150,000 marks for the longest duration over the sea or the coast within 5 km. of the sea.

"The Julius Wander-Preis"—a silver cup—will be awarded in 1923, 4 and 5 to the German pilot who covers the longest distance with an overall gliding angle not steeper than 1 in 50. The cup will become the property of the first pilot who holds it twice.

The "Fokker" Prize of 200 Dutch florins is offered for the first flight of not less than 25 km. from the Wasserkuppe. This competition is open up to May 1, 1923.

The *Berliner Tageblatt* offers 100,000 marks which it is proposed should be given for the greatest distance flown by a glider. Conditions are not yet settled.

These various prizes are in the main offered under the organisation of the Aero Club of Germany or of the "Wissenschaftliche Gesellschaft fur Luftahrt" (Aeronautical Society). But it is said that there are too many different authorities concerned and too many prizes offered under conditions dictated by individual donors to achieve the best use of the total sum available to encourage soaring and gliding.

This is probably true—but English would-be gliders will probably feel that in this country a diversity of small prizes would produce a greater result than the one big prize at present open in England.

BRITISH GLIDING PRIZES.

Though it is not yet possible to make any definite announcement, it may be stated that there is a probability, amounting almost to a certainty, that there will be offered in this country certain prizes for gliding and low-powered flying other than the Duke of Sutherland's and the Selfridge prize which have already been announced.

GOOD WORK IN JAPAN.

His many friends among the former personnel of the R.N.A.S. and the R.A.F. of to-day will be glad to hear that Captain W. L. Jordan, D.S.O., who is now employed as an engineer by the Mitsubishi Company in Japan has been giving the Japanese a demonstration of getting off and landing on the deck of the Japanese aircraft carrier *Hosho*. Apparently he first performed the double feat on Feb. 21 and did it again on Feb. 23.

On the latter occasion it was said that the wind was blowing at a speed of 14 metres per second and the waves were "considerably high" but the ship "was prevented from rolling by the stabiliser." The particular form of stabiliser used for the ship is not disclosed nor is the particular type of machine used by Captain Jordan.

For performing this feat Captain Jordan has been awarded a prize of 15,000 yen by the Japanese Government.

Apropos deck-landings the following interesting paragraph appears in the "Osaka Mainichi":—

"Captain Yamada, naval inspector in Nagoya, when interviewed, said: 'In America, a huge electro-magnet is provided on the mother ship, and the aeroplane, equipped with an iron piece, is caused to be attracted to the mother ship by the magnet, by turning on an electric current. This invention may insure the safe arrival of planes. The present trial flight is looked upon as important by the authorities and is not open to any except officers in active service. At the time of landing, a hemp cord net will be spread on the upper deck of the *Hosho* to safeguard the plane from falling, it is learned." The idea of pulling up a deck-landing machine by switching on a large electro magnet is at any rate entertaining if somewhat imaginative. It is also somewhat ancient, having been investigated in England *circa* 1916.

THE AFTERMATH OF THE MADRID MEETING.

As the result of the Madrid meeting organised by the Spanish War Office to determine the types of aircraft to be ordered by the Spanish Flying Corps, orders have been placed for 20 Nieuport 29C1 single-seater scouts and 5 Farman "Goliath" bombers.

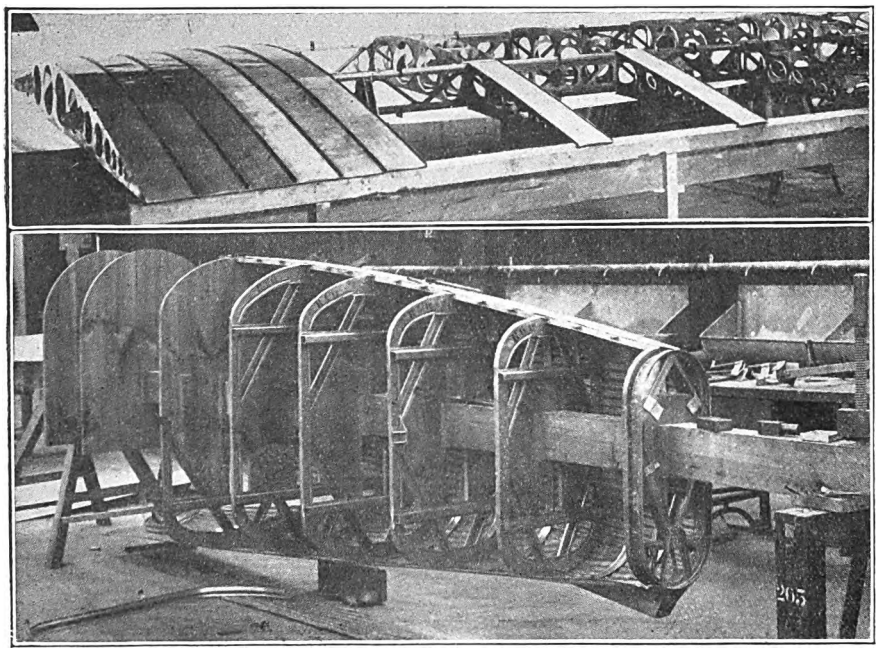
In the two-seater reconnaissance class it has not yet been decided whether to order the Breguet 19A2 (400-h.p. Lorraine-Dietrich), the DH9b (Aircraft Disposal Co. modification—360-h.p. Rolls-Royce "Eagle") or the Fokker CIV (450-h.p. Napier "Lion").

This last machine did not put in an appearance until after the meeting. It is not stated whether these three machines will undergo further flying tests or that their merits will be adjudged on the ground.

TWO NEW HEIGHT RECORDS.

On Mar. 27 at Buc, M. Jean Casale flying the Bleriot Spad 56 (375-h.p. Gnome-Rhone-built Bristol "Jupiter") reached a height of 8,200 metres (26,896 ft.) carrying a useful load of 250 kgs.

On Mar. 12 at Madrid, M. Thierry on a Breguet 19A2 (400-h.p. Lorraine-Dietrich) reached a height of 5,992 metres (19,564 ft.) carrying a useful load of 500 kgs. This record has been homologated by the Spanish Aero Club.



GERMAN METAL CONSTRUCTION.—The upper photograph shows the wing of a Dornier machine partially covered. The very narrow girder spars are of steel construction. On these are a number of fairly heavy box-ribs of duralumin, two of which may be seen to the right. Between these ribs there is nothing but the sheet-covering shown complete over the left section of the rib.

Below the fuselage of a Junkers six-seater is shown in course of construction. The series of duralumin channel-section bulkheads are seen threaded on a central locating jig. On the far side, the corrugated sheet-covering is in place.

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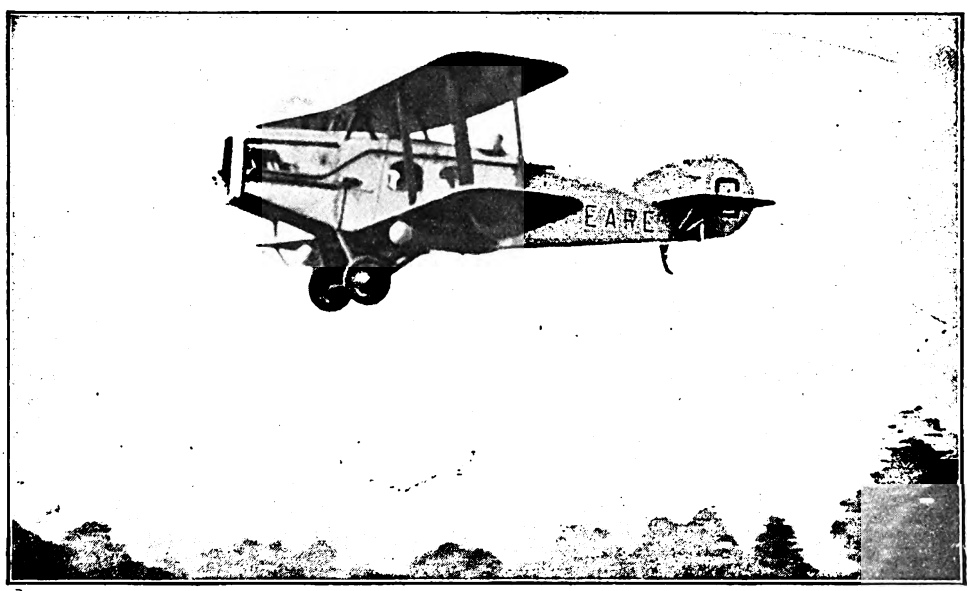

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THE HISTORY OF GLIDING

With the revived interest in gliding of the present day Mr. J. Bernard Weiss' history of gliding and soaring has made an opportune appearance.

As the son of Mr. José Weiss, Mr. Weiss has a hereditary interest in and enthusiasm for his subject, and he has in a compact but adequate form given an outline of the history of gliding during the past century, showing precisely how much aviation in general owes to this branch of activity and how much more it might have owed had a more intelligent use been made of the opportunities for experiment which gliding affords.

The book is well-produced and illustrated, is moderate in price, and should be in the hands of all who take any interest in the history of aeronautics.

["Gliding and Soaring Flight." By J. Bernard Weiss. London: Sampson, Low, Marston & Co. Ltd. 5s. net.]

SHOCK-ABSORBER RINGS.

Rubber cord as used to-day on aircraft is undoubtedly the most widely-used material for shock-absorbing purposes because of the valuable natural properties of rubber.

There are, however, certain defects introduced into the ordinary length cord by the methods of manufacture. These cords are made in lengths according to the diameter; for example, a $\frac{5}{8}$-inch cord runs into lengths of about 60 yards, $\frac{1}{2}$-inch about 90 yards, and $\frac{3}{8}$-inch about 180 yards. To manufacture the $\frac{5}{8}$-inch cord about 20 yards of bare rubber are required, $\frac{1}{2}$-inch about 30 yards, and $\frac{3}{8}$-inch about 60 yards.

The covers are braided on when the rubber is under considerable strain, and it is evident that it is difficult, if not impossible, to prevent creep of the rubber during the process, with the result that the cord varies in strength. Experience shows that it is practically impossible to make even 20 yards of ordinary cord of uniform strength.

The method of manufacture of the "Turner Ring" Shock-Absorber made by Luke Turner & Co. of Leicester is very different and it is claimed very much better results can be obtained.

Each ring is made of a single strand of rubber wound to the required number of turns, with the two ends tied together. This ensures the minimum variation in the strength of the rubber.

It is extremely difficult to make an ordinary length cord of more than 300 strands with an average tensile strength of about 270 lbs. at 100 per cent. extension. The "Turner Ring" is now made of as many as 900 strands, the complete ring carrying 3,500 lbs. at 110 per cent. extension. Rings made of 500 and 600 strands are quite common, and the advantage of these large rings is evident especially in the case of large machines. It is claimed for this form of shock-absorber that:—

(1) Rings can be made of any strength within the capacity of the materials. (2) No joint is required. (3) Machines can carry their own spare rings which can be stowed away in a very small space. (4) Should one ring be damaged it alone can be cut away and replaced by a spare. In the case of ordinary cord probably the whole length will have to be replaced. (5) As all rings for any particular plane are made to the same internal diameter, each one carries its proper proportion of the load. As ordinary cord is wound by hand, under tension it is very doubtful whether each loop is under the correct strain. (6) The rings are easily placed in position on the undercarriage.

MR. J. H. JAMES.

Mr. "Jimmy" James who for the past two years has done so much fine work on the "Bamel" and other Gloucestershire products is now starting a concern for the testing of aircraft.

It will be remembered that with Mr. L. R. Tait-Cox he founded the firm of Tait-Cox and James for a similar object. Mr. James was too busy with the Gloucestershire company and Mr. Tait-Cox joined Major Jack Savage's sky-writing concern and so the Tait-Cox and James firm ceased to function.

Now that the Aircraft Industry shows signs of revival Mr. James has decided to start test-work again. He was recently up at Coventry where he demonstrated a Siddeley "Siskin" before the Infanta of Spain.

His skill as a pilot has never been doubted and his beautiful handling of the "Bamel" during the past two years has firmly established him as one of the finest pilots in the world.

His address is c/o S. B. Smith & Co., 10, Savoy Street, Strand, W.C.2.—G. D.

A CORRECTION.

In the official announcement of the formation of Inventions Developments Ltd. it was stated that Mr. S. G. Wybrow was one of the first directors. THE AEROPLANE has been informed that at the first meeting of the Company called to elect directors that gentleman's name was not submitted or put forward for office and that he is therefore merely a subscriber to or shareholder in the firm in question.

A NEW SAVOIA DESIGNER.

The report that Ing. Marchetti, designer of the Marchetti-Vickers-Terni biplane, has joined the Savoia firm, who are already at work on a fast aeroplane of predominantly metal construction, appears to be true. It is barely conceivable that any craft other than the M. V. T. or progeny is intended. The firm have promised me early particulars and don't deny the accusation as to land-going craft.—T. S. H.

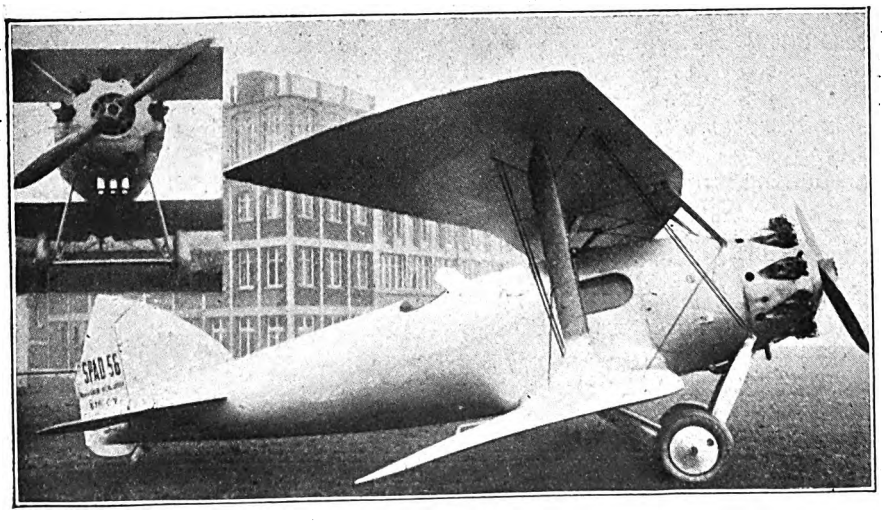
NEW COMPANIES.

WORLD FLIGHT FILMS SYNDICATE, LTD.—Private company. Registered Mar. 28. Capital £4,200 in 4,000 preference shares of £1 each and 4,000 ordinary shares of 1s. each. To adopt an agreement with N. MacMillan and G. H. Malins, and to carry on the business of photographers, dealers in films and cinematograph and other photographs and pictorial representations and reproductions, etc. The first directors are: N. MacMillan, 3, Clifford Street, W.; G. H. Malins, 2, Markham Square, Chelsea, S.W., aviator. Qualification £50. Remuneration £50 per annum. Secretary: A. Fraser, 193, Wardour Street, W. Registered office: 6, Adam Street, Adelphi, W.C.2.

MORTGAGES, CHARGES & SATISFACTIONS

DRAKE AERONAUTICAL ENGINEERING SYNDICATE LTD.—Satisfaction in full (a) on Feb. 1, 1923, of mortgage dated Nov. 27, 1919, securing £400 and (b) on Feb. 2, 1923, of mortgage dated Sept. 30, 1919, securing £800.

BRITISH ANZANI ENGINE CO. LTD.—Satisfaction to the extent of £1,323 6s. 8d. on Mar. 9, 1923, of debentures dated Sept. 10, 1920, securing £10,000.



The Spad 56 with the French-built "Jupiter" engine on which M. Casale established a height record of nearly 27,000 ft. carrying 250 kg. of useful load, as is recorded in a paragraph on the previous page.

This performance is naturally regarded as a very great tribute to the qualities of the engine, and reflects great credit on the Bristol Co. who are responsible for the design and on the Gnôme-Rhone Co. who build the engines in France under licence.

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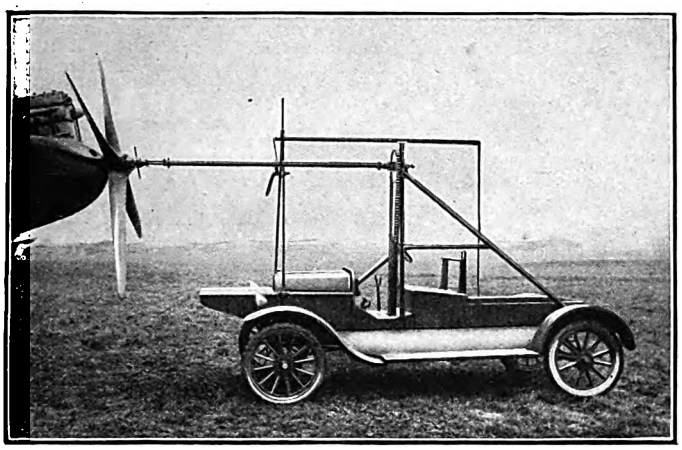


"STARTS ANY AERO ENGINE FROM COLD IN 30 SECONDS."

This apparatus, which is primarily an Aero Engine Starter, is also invaluable as a general aerodrome "run-about," for the carriage of fire extinguishers, petrol, oil, water, tools, spare parts, etc.

Used at all the principal Military and Civil Aerodromes.

Write for descriptive booklet to the manufacturers:

THE DE HAVILLAND AIRCRAFT CO., LTD.,

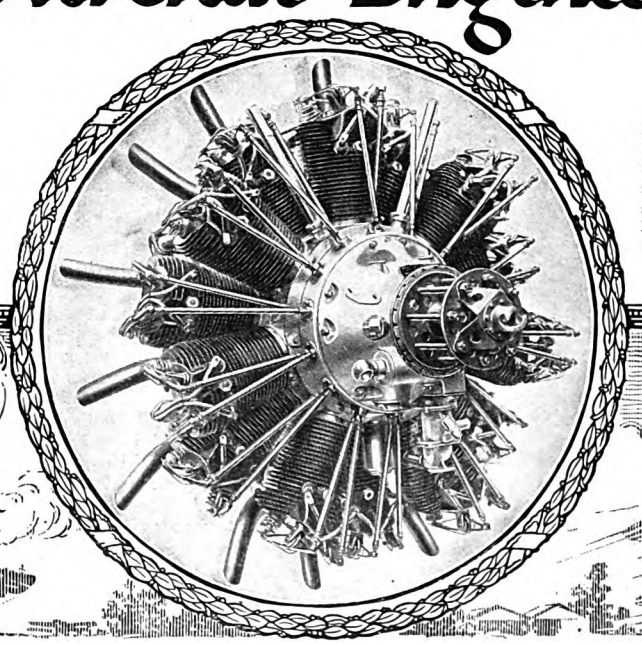
Telephone
KINGSBURY 160, 161.

STAG LANE AERODROME,
EDGWARE, MIDDLESEX.

Telegrams:
"HAVILLAND, EDGWARE."

ARMSTRONG SIDDELEY
Aircraft Engines

The "JAGUAR"
(Trade Mark)
gives 350 h.p. at 1,600 revolutions. It is the most compact and complete unit for its horse power ever produced. Outside diameter is only 43 ins. Low petrol and oil consumption and perfect cooling.



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150 h.p. 7 cyl. Radial.
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AIRCRAFT IN PARLIAMENT.

THE SERVICES CO-ORDINATION COMMITTEE

On Apr. 5 MR. GWYNNE informed Lt./Col. Fremantle that the Government had considered the report of the Committee on the co-ordination of the technical services of the Navy, Army, and Air Force, and steps were being taken, particularly by the establishment of inter-departmental technical committees, to carry out the necessary detailed measures of co-ordination It was not proposed to publish the report of the Committee

LT.-COL. FREMANTLE: "Are we to understand that this most vital decision is being already acted upon without any report being made to this House or any opportunity being made for discussion?"

MR. GWYNNE: "Yes, the Cabinet has decided."

CAPT. WEDGWOOD BENN: "Why is it not advisable to publish the report?"

MR. GWYNNE: "It is not usual in these cases, and there seems no reason for departing from the usual procedure."

WAR EMERGENCY MATERIAL.

In the House of Commons on Apr. 11 in reply to a question by LIEUT.-COL. MOORE BRABAZON, the SECRETARY OF STATE FOR AIR said that with reference to the two aeroplane accidents at Shotwick on Mar., 20 and 26 the cause of the first accident had no connection with the condition of the aeroplane and that of the second is still under investigation. In neither case was the aeroplane either re-conditioned or of pre-Armistice date.

[It would seem then that the second machine, which admittedly broke in the air, was a post-Armistice machine which had never been re-conditioned. That would probably mean that it was a more dangerous machine than either a mid-War machine (which might have been built of the excellent selected material then available) or a re-conditioned machine (in which defective material would have been replaced by good modern selected material). The 1919 machines, barring a few experimental types, were built of war-emergency material such as would not have passed the A.I.D. inspection up to the beginning of 1918 Hardly any new high-grade material came into the country during 1919 and nearly all machines of the 1919-20 vintage were built of left-over war material. Therefore machines of that period ought to have been scrapped in 1920-21 and replaced either by new machines or by carefully re-conditioned machines. This matter deserves further investigation.—C. G. G.]

OPERATIONS IN THE EAST.

In the House of Commons on Apr 12 SIR SAMUEL HOARE (SECRETARY OF STATE FOR AIR), in reply to MR. LANSBURY, said that during the year ending Mar. 28, 1923, bombing attacks were carried out in connection with the military operations in Waziristan but that there were no independent punitive raids carried out by the R.A.F. on the Indian Frontier. In Iraq and Southern Kurdistan there had been nine punitive air expeditions. The casualties to R.A.F. personnel in these operations were:—India, three officers and one airman killed, two officers and one airman injured. In Iraq three officers killed and one injured. It was not possible to give the casualties sustained by the tribes, but it seemed certain that the use of air action resulted in a decrease in the loss of life. The bombs used were 230 lb., 112 lb., 20 lb. and incendiary bombs. On the N.W. frontier air operations formed part of the military operations against tribes with which the Government of India were in a state of war but in Iraq punitive air expeditions were only undertaken at the request of the Civil authorities in cases where ground expeditions would otherwise have been necessary.

The following is from *The Times*:—

MR. LANSBURY: May I ask whether the people who are bombed are able to retaliate? (Ministerial ironical laughter.) Well, I will ask another question, and that is whether the right hon. gentleman and his colleagues do not think the time has arrived to stop this Hunnish, barbarous method of warfare? (Renewed Ministerial laughter and cries of Order.)

MR. KIRKWOOD (Lab.-Soc., Dumbarton Burghs): And they—referring to the Ministerial members—objected to us punching their friend because he was not fit!

MR. COBHAM'S LATEST TOUR.

The tour to India undertaken by a wealthy American in a De Havilland 9 with Siddeley "Puma" engine piloted by Mr. Alan J. Cobham, the chief pilot of the De Havilland Hire Service, was stopped in Palestine by the Foreign Office which for some reason saw fit to forbid a civilian machine from flying over the Desert Route which has been followed for something like two years by the Cairo-Baghdad Air Mail.

One learns from Mr. Cobham that by last week he had covered just on 7,000 miles in the course of his tour. Starting from London on Feb. 25, with Mr. Woodhams, one of the De Havilland engineers, he picked up his American passenger in Paris and complete with luggage for the three and spare parts for the machine and engine he flew to Marseilles, Pisa and Rome.

They passed over Brindisi, as it is impossible to land in or get out of the aerodrome there in the Winter, and landed at Athens. Thence they flew via Crete to Sollum on the North African coast, afterwards visiting the Siwa Oasis, and went on to Cairo via Matruh. After a stay in Cairo they flew up the Nile to Assiut, Assouan and Wadi Halfa, which is practically the boundary of the Soudan. Thence they came back to Luxor, and so to Cairo.

From Cairo they flew up to Jerusalem in time to see the historic Good Friday processions and thence they visited Damascus and Aleppo. The return trip to Cairo was down the coast via Ramleh.

The homeward route on which the aviators are now travelling is via Tripoli, Tunis, Algiers, Morocco and Spain.

PERSONAL NOTICES.

ENGAGEMENTS.

HOLLAND—MARTIN.—The engagement is announced between Capt. W. T. F. Holland, A.F.C., late 21st Lancers and R.A.F., only son of the late Mr. and Mrs. Walter Holland, late of Compton Hill, Farnham, and Wood Hall, Worcester, to Marie, widow of Brig.-Gen. C. T. Martin, D.S.O., H.L.I., and only daughter of Mr. and Mrs. Andrew Strang, Limekilns, East Kilbride, Lanarkshire.

SLESSOR-CARTER.—A marriage will shortly take place between John Cotesworth Slessor, M.C., F/Lt., R.A.F., eldest son of Maj. Arthur Slessor, late the Sherwood Foresters, and Mrs. Slessor, of Newland House, Eynsham, and Hermione Grace, widow of Lt./Col. Herbert Carter, M.C., The King's Own Yorkshire Light Infantry, and elder daughter of Mr. and Mrs. Gerald Guinness, of Dorton House, Buckinghamshire.

MARRIAGES.

HOWELL—PRESTON.—On Apr. 7, at Blackheath, John Gwynne Howell, M.C., (late Major, R.A.F.), only son of Mr. and Mrs. Howell, Manorbier, Pembrokeshire, and grandson of the late Lt./Col. Howell, Penrheol, Carmarthenshire, to Jessie Elizabeth, daughter of the late Deputy Inspector-General Theodore J. Preston, R.N., and of Mrs. Preston, 108a, Shooters Hill Road, Blackheath.

JENKINS—FERGUSON.—On Apr. 14, at the Savoy Chapel Royal, Capt. Frederick Cyril Jenkins, late 3rd London Regt. and R.A.F., to Inez Mary Mackay Ferguson, only daughter of Mrs. J. M. Ferguson, of 17, Fairfax Road, London, W.4.

STENT—COX.—On Feb. 14, in London, S/Ldr. Frederick W. Stent, M.C., R.A.F., of Cairo, Egypt, to Gladys E. Cox, of 15, New Cavendish Street, London, W.1.

TEMPEST—FERNANDES.—On Apr. 5, at All Saints', Rutland Gate, Major W. J. Tempest, D.S.O., M.C (late R.F.C.), son of Mr. and Mrs. Tempest, of Ackworth, Yorks, and Ethel Luis, daughter of Mr. and Mrs. Fernandes, of Ackworth House.

BIRTH.

ADES.—On Apr. 11, at The Poplars, Ryde Vale Road, Balham, to Marjory Ailsa and F/O. Esmond Selby Ades—a son.

THE FORMATION OF AMERICA'S REPRESENTATIVE BODY.

The following amusing account of how the National Aeronautic Association, which represents the U.S.A. in the Fédération Aeronautique Internationale, was formed has been received from a friend in America. It is an excellent description of how American "hustle" works in practice, and it reminds one very much of the way in which the famous Aircraft Supply Board was formed when the States ultimately decided to fly to the succour of the vanquishers in the recent war:—

"Last October the new National Aeronautical Association, since recognised by the F.A.I., was launched. A similar attempt had been made at Omaha the year previously, but failed. During the year following, the interests which since 1917 have largely dominated the American Aviation Industry were able to perfect their plans.

"Invitations were sent broadcast to everyone who might by any chance be willing to go to Detroit. In some instances variously assorted parties were gathered together by individuals who wished some publicity. All who came were welcome—the more the merrier.

"A strenuous program had been prepared which allowed no time for discussion. Before there were hardly fifty people on the premises, officers were elected for each of the six districts corresponding to the six administrative divisions into which the country has been divided by the Army. One of the southern districts had only two representatives present who named themselves and friends to offices.

"Articles of incorporation under the laws of the state of Connecticut had been prepared, and as soon as these could be signed they were sent to Hartford, Connecticut, in an army 'plane. This enabled the election of officers to be held the following day, when the new Association had been duly incorporated in Connecticut.

"The nominating committee presented three names for each office, but, as the time came to ballot for the principal offices, two of the candidates would arise and gracefully decline the nomination, and the election would be made unanimous. Never was there a smoother working machine.

"Several individuals connected with the Manufacturers' Aircraft Association arose at intervals and declared that their Association had no interest in the new National Organisation. However, the personnel in office insures as much mutual interest as could be desired.

"The new N.A.A. maintains a rather energetic publicity bureau in Washington, and those in charge have worked hard in support of certain legislation much desired by the Manufacturers' Aircraft Association. Much to the latter's annoyance Congress has adjourned without taking any action—just at the time when the Wright patents are about to expire. This will remove the chief means whereby the Manufacturers' Aircraft Association has maintained a hold on the Aviation Industry.

"Subsequently the annual meeting of the Aero Club of America was held in New York. The Chairman of the meeting read in all haste the reports and recommendations of the

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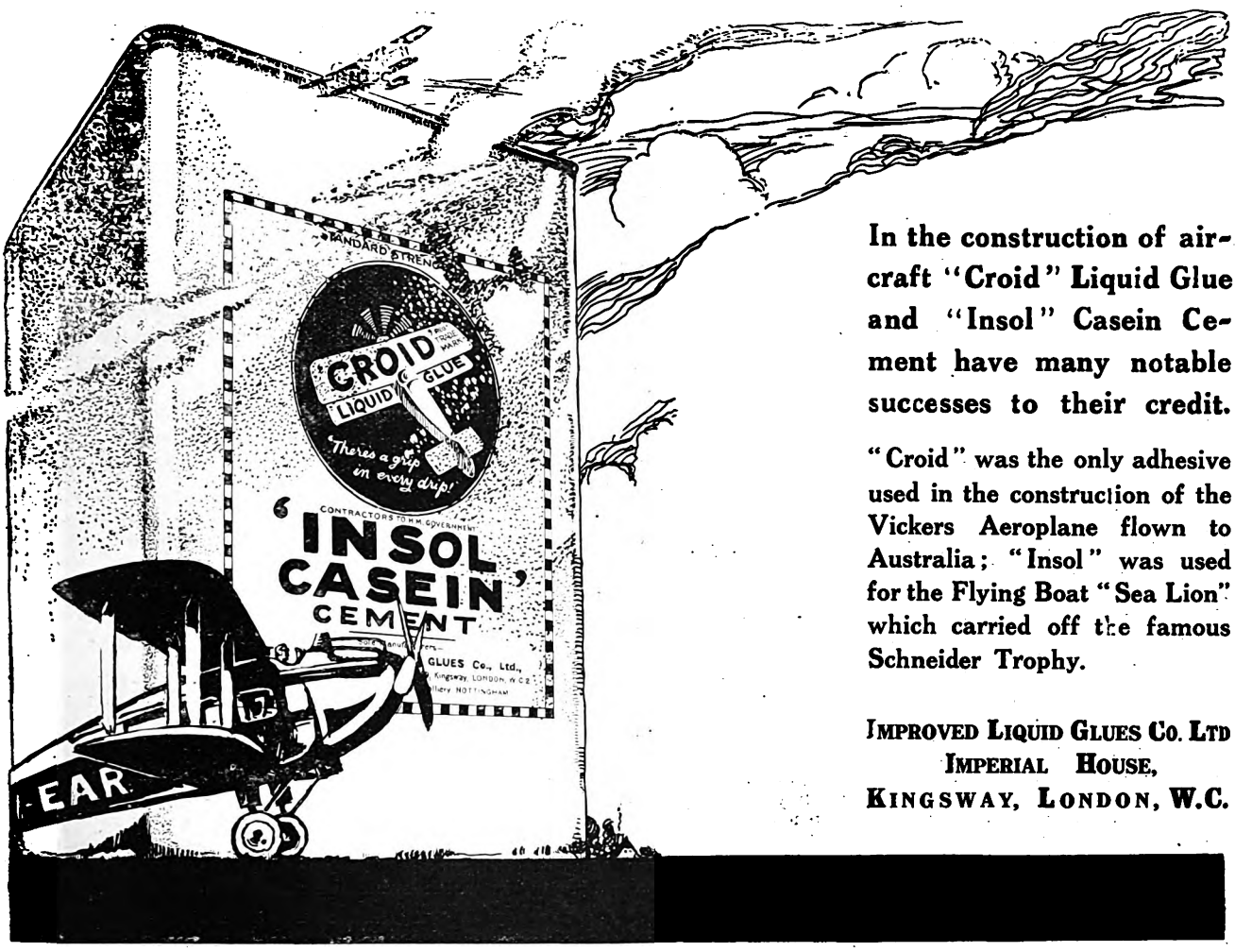

In the construction of aircraft "Croid" Liquid Glue and "Insol" Casein Cement have many notable successes to their credit.

"Croid" was the only adhesive used in the construction of the Vickers Aeroplane flown to Australia; "Insol" was used for the Flying Boat "Sea Lion" which carried off the famous Schneider Trophy.

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Contractors to the Leading Governments of the World.

During this period a highly trained Design and Technical Staff has been developed which is at the disposal of clients for the production of Designs to suit special requirements of service conditions.

OUR WORKS ORGANISATION ensures absolute reliability and quality of workmanship.

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Board of Governors. Motions were made and passed without inviting any discussion. Only an exceptionally keen mind and ready tongue could possibly get a *No* in between the request for the negative vote and the ruling that the motion was passed. The extreme desire of the Chair to expedite the business of the evening exceeded by far anything I have ever encountered. With the aid of two assistants he was able to transact all business without the slightest pause.

"Some of the more violent objectors had been restrained by court injunction from attending the meeting. Thus were the trophies and assets of the club turned over and the club became only a name.

"The Aero Club of America had always been kept alive by donations from wealthy patrons. Those who now control everything have not contributed largely to the support of anything. They have however hunted around for a means of persuading a larger portion of the public to contribute to the support of what they control. The membership of the Aero Club of America has always been very high-grade.

"The A.C.A. had its faults and the N.A.A. does not seem much better. Organisations controlling the sport of aviation should not be controlled by business interests. Just why the F.A.I. were so prompt in recognising the N.A.A. I would very much like to know."

A TRIBUTE TO BRITISH AIRCRAFT.

In answer to a number of questions put to him in the Dutch equivalent to the House of Commons concerning the ordering of a number of British aircraft for use by the Netherlands East Indies Air Service, the Minister of Colonies said :—

"It is correct that the Colonial Department has bought some Vickers' 'Viking,' De Havilland, and Avro aeroplanes in England which are required for the Indies."

"The Indian Air Service appears to have more faith in these than in the existing Netherlands types. Several authorities, including Dutch Officer Pilots, have agreed with the choice of the Indian Air Service. Practically everybody gives the preference to the Avro machines instead of the Spijker and Fokker machines in use in Holland."

"The opinion of the Fokker scouts sent to the Indies in 1922 is not altogether favourable so that no further orders for this type are to be expected, whilst the works which supplied the Spijker and Van Berkel machines have closed down."

"In judging the fact that here in Holland practically only machines of Netherlands manufacture are used, one must not forget that the choice has been influenced by the desire to maintain a Netherlands aeroplane industry. In the Indies this is a factor of less importance and quality and price are the main factors in determining the choice."

"Nevertheless, the Netherlands Industry would be supported in the Indies if the quality and flying characteristics of the material become as good as foreign products."

"The Colonial Department cannot bring any influence to bear and can only comply with the demands and requests of the Indies."

The following is a list of machines purchased since 1919 for service in the Dutch East Indies :—

12 DH9 and 12 Avro 504K, May 31, 1919; 12 Avro 504K, Dec. 18, 1919; 6 DH9, Mar. 9, 1921; 8 DH9, Apr. 11, 1921; 8 Vickers "Viking Mk.IV," May 2, 1921; 6 Fokker DVII, June 30, 1921; 2 Vickers "Viking Mk.IV," Sept. 7, 1922; 10 DH9, Sept. 8, 1922; 12 Avro 504K, Nov. 8, 1922.

VICKERS AIRCRAFT FOR CANADA.

Mr. P. Maxwell-Muller has recently returned from Canada, where he went to superintend the preliminary arrangements for the construction of the Vickers "Vikings" ordered by the Canadian Government.

Eight machines have been ordered. Of these two are being built at the Weybridge works, and the remainder have to be built in Canada. They will be constructed at the Vickers Works near Montreal, on the St. Lawrence River.

A section of these works has been set apart for aircraft work, and the shops are well-equipped. They are also ideally situated for their present purpose, as the woodworking, fitting, assembling and other departments form two sides of a rectangle which encloses a dock, onto or into which the machines can be floated direct from being assembled. A small selected party of foremen, draughtsmen, woodworkers, fitters, etc., is being sent out there from the Brooklands works to assist the Canadian works.

The Laurentide Company have done a considerable amount of useful work in forestry, etc., using a "Viking" and a number of American machines. Seaplanes or better still amphibians are the most suitable types, as the large lakes and wide rivers offer the best landing facilities.

A fair amount of flying is carried on also by the Canadian Air Service pilots, some of whom are very good indeed.

Mr. Muller was impressed with the technical and business ability of the Canadians, who want to know everything possible about the goods one has to sell them; it is no use having only a partial knowledge of one's business when dealing with them.

As regards the activities at the Brooklands works just now, these are many and varied, and overtime is being worked in some departments. A certain amount of reconditioning of old machines is being done, and new designs are being prepared.

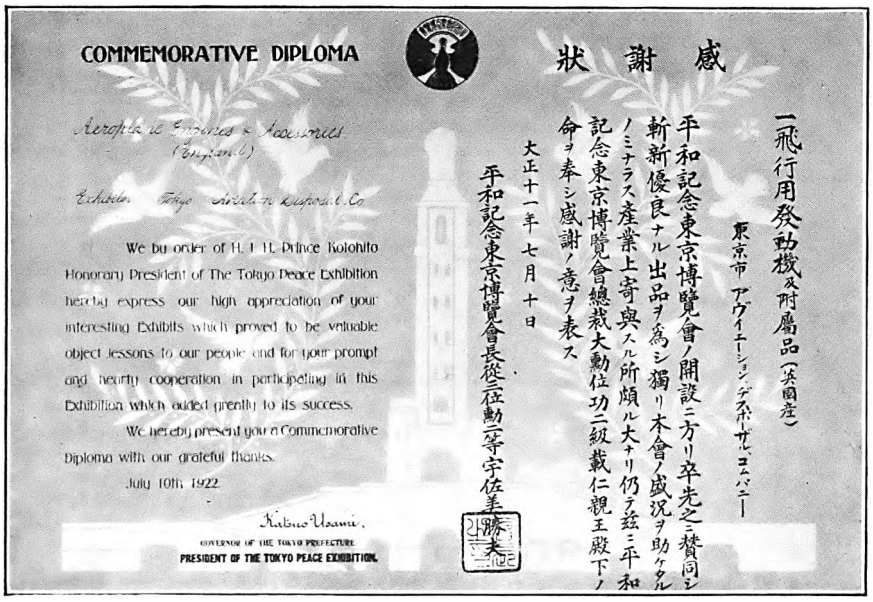
The "Viking Mark VII" will appear before very long. The "Vixen" is now at Martlesham Heath, where it is performing satisfactorily. A "Vulcan" fitted with a Napier "Lion" is also at the same place, and the increased horse-power has worked wonders in her performance. Experimental work with metal wings is still progressing, and there is a possibility of metal wings being fitted to the "Vixen" shortly, in which event the machine would be practically "all-metal."—J. F. S.

ARTERIAL SURVEY.

Sir Henry Maybury, Director-General of Roads, presiding during the reading of a paper on the new arterial roads before the London Society by Mr. C. H. Bressey, Chief Engineer, Roads Dept., Ministry of Transport, said that Mr. Bressey had so much imagination and interest in the schemes as to get aeroplanes to make a survey so that the work could be put in hand promptly.

GERMAN LITERATURE.

A German reader of THE AEROPLANE who has an exceptionally interesting collection of German war-flying books written by the leading German star pilots as well as a complete collection of the German journal "Flugsport" for the years 1916-22 inclusive and a number of other German books of the less technical kind concerned with aviation wishes to sell them in order to help him to continue his University course. If any reader of this paper is desirous of acquiring such a collection he can be put in touch with the proprietor by communicating with the editor of this paper.


COMMEMORATIVE DIPLOMA

感謝狀

Aeroplane Engines & Accessories (England)

Exhibit, Tokyo Aviation Disposal Co.

We by order of H. I. H. Prince Kotohito Honorary President of The Tokyo Peace Exhibition hereby express our high appreciation of your interesting Exhibits which proved to be valuable object lessons to our people and for your prompt and hearty cooperation in participating in this Exhibition which added greatly to its success.

We hereby present you a Commemorative Diploma with our grateful thanks.

July 10th 1922

Kubio Usami,
GOVERNOR OF THE TOKYO PREFECTURE
PRESIDENT OF THE TOKYO PEACE EXHIBITION.

平和記念東京博覽會總裁大勳位功二級載仁親王殿下ノ命ヲ奉シ感謝ノ意ヲ表ス

大正十一年七月十日

平和記念東京博覽會長從二位勳一等宇佐美勝夫

斬新優良ナル出品ヲ爲シ獨リ本會ノ盛況ヲ助ケタルノミナラス產業上寄與スル所頗ル大ナリ仍テ茲ニ平和記念東京博覽會ノ開設ニ方リ卒先之ニ贊同シ

一飛行用發動機及附屬品（英國產）

東京市 アヴィエーション・ディスポザル・コムパニー

A NEW SIKORSKY SCHEME.

The Sikorsky Aero Engineering Corporation was chartered on Mar. 5, 1923, by the Secretary of State of New York, with a capitalisation of $200,000.

The purpose of the Corporation is to build, sell and in general exploit the aeroplanes of Mr. I. I. Sikorsky's system.

Mr. I. I. Sikorsky, who is President of the Corporation, is the famous Russian constructor of the first multi-motored aeroplane in the World, as well as the first successful large aeroplane.

The other officers of the Corporation are :—Mr. W. A. Bary, Treasurer; Mr L. A. Shoumatoff, Secretary.

The offices of the Corporation are temporarily located at 114, East 25th Street, New York City.

A STRIKING TESTIMONIAL. — An acknowledgment from the Japanese Government of the good work done by the Aircraft Disposal Co. Ltd. in furthering the popularity of Aviation in Japan.

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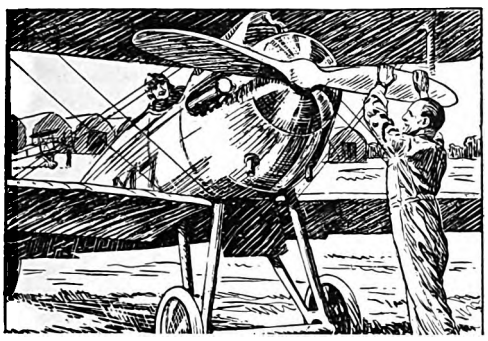

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"BP" is manufactured at Llandarcy, South Wales. Here only the most modern methods known to the industry are employed and every drop of Spirit produced is manufactured to a standard—the "Best Possible."

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Try "BP" Aviation Spirit in your Motor Cycle and know that miles as well as time can fly.

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DESIGNERS AND CONSTRUCTORS OF THE

WE CLAIM THESE FACTS **World's Fastest Flying Boat** WE CLAIM THESE FACTS

"A SEAWORTHY HULL THAT WILL FLY."
Originators of Circular Hull Construction.

The longest experience of FLYING BOAT building in this Country—11 years,
The best speed performance of FLYING BOATS in 1917—100 M.P.H.
The best speed performance of FLYING BOATS in 1918—118 M.P.H.
The best speed performance of FLYING BOATS in 1919—147 M.P.H.
Originators of the first Amphibian FLYING BOAT SCOUT in 1921.—This type of machine won the Schneider Cup, establishing world's records in 1922—163 M.P.H.

We produced the first English Commercial FLYING BOAT—1919.
We produced and ran the first British Commercial FLYING BOAT SERVICE—1919.
We established the first International Commercial FLYING BOAT service—England to France, 1919.
We hold the first commercial Flying Boat Certificate of Airworthiness issued by H.M. Air Ministry.
We were awarded the second prize of £4,000 in the Air Ministry's Competition for AMPHIBIANS, 1920, which was increased to £8,000 in recognition of the general excellence of design and construction of the Supermarine Amphibian Flying Boat. This was the only machine to accomplish all the tests and that had no breakages during the trials.
We produced the first specially designed Deck-landing Flying Boat, 1921.
We hold the first official world's records granted by the F.A.I. for Marine Aircraft—duration of 1 hr., 34 mins., 51⅘ secs. Longest distance accomplished 230 miles. Fastest time for 100 kilometres - 62 miles, 28 mins., 41⅕ secs. Fastest time for 200 kilometres - 124 miles, 57 mins., 37⅘ secs.—1922.

WINNER

of the International Race for the

SCHNEIDER CUP

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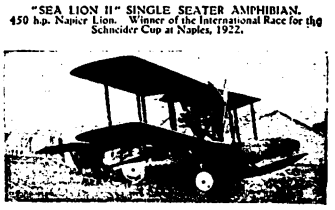

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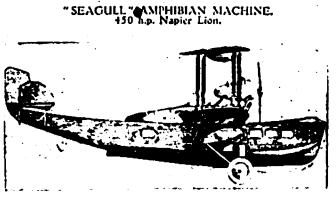

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

Trips per Day.—Monday, 16; Tuesday, 15; Wednesday, 14; Thursday, 16; Friday, 15; Saturday, 17; Sunday, 3.

London—Paris:

Handley Page Transport, Ltd., machines, 18*, passengers 152, freight 3,632 lbs.; Air Union, machines 28†, passengers 73, freight —; Total machines 46; passengers 225.

London—Brussels—Cologne:

Instone Air Line, Ltd., machines 14*, passengers 72, freight —.

Manchester—London—Amsterdam:

Daimler Airway, machines 24, passengers, Manchester-London, 11, London-Amsterdam, 40, freight —.

London—Rotterdam:

K.L.M., machines 12, passengers 18, freight —.

Total number of trips by British machines: 56, carrying 275 pas. Foreign machines: 40, carrying 91 pas.

Statistics.

For week ending April 15:—

Machines, 96; Passengers, 366; Crews, 756; Total Personnel, 522.

Corresponding week last year:—

Machines, 75; Passengers, 211; Crews, 128; Total Personnel, 339.

Corresponding week, 1921:—

Machines, 53; Passengers, 179; Crews, 69; Total Personnel, 248.

Corresponding week, 1920:—

Machines, 36; Passengers, 32; Crews, 36; Personnel, 68.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

The number of passengers and the amount of freight carried is still on the upward trend and the record is likely to be broken very shortly. On several days last week Handley Page Transport ran two machines in each direction, thus approaching every day and in every way nearer to the limit of 600 flights which the firm has contracted to perform under the present subsidy system, or "sobe silly systeb" as an adenoidal child called it recently.

On Thursday of last week the Instone Air Line took part in the making of a film called "Out to Win." Numbers of curious yellow-faced passengers were seen lurking about the aerodrome and made one think of the Editor's pet Mongol Invasion. They then embarked in a D.H.34 in which were the villain and the heroine. The hero dashed down at the last moment and tried to book a seat but was repulsed on all sides as the machine was full, even the plea that he was "only a little 'un" seemed unavailing.

The hero then put on the "strong silent look," so well known in novels, and the machine took off piloted by Mr. Barnard leaving the hero behind. It was not clear whether he was discarded from strength or weakness.

In the other front seat was Mr. Jock Stewart of the Wireless Section who proceeded to make the flight useful by carrying out wireless tests. It was believed by many that when in the air he became "Uncle Jock" and told the Air Ministry a bedtime story.

Many people thought the film could have been greatly improved by getting the Director of Civil Aviation to bid a tender farewell to the heroine with the Controller of Aerodromes and Licences looking over the top plane, while Col. Bristow on behalf of Ogilvie and Partners Ltd. on behalf of the Instone Air Line might have given the whole proceedings his archimandritical blessing.

Negotiations for the start of the London-Berlin Services are proceeding and the Daimler Airway hopes to start this in a week or two.

Messrs. Muir and Youell had a good trip to Spain on two D.H.9s which they delivered for the Surrey Flying Services. Mr. Muir says that he has surpassed previous trippers over the Pyrenees by being attacked by an eagle with three heads!! Mr. Herne is said to be issuing specifications and asking for tenders for a biplane eagle which is a two-seater and can fly both ways!!!

The Aircraft Disposal Company have converted the King's Cup D.H.9 (G-EBEN) into a mail-carrying machine and they are now prepared to give demonstrations of rapid mail-work.

The variable camber monoplane is not yet tested. At present the Air Ministry will not grant an airworthiness certificate and in consequence the insurance people will not insure. However the "Airworthy" should come through shortly.

Capt. Rex Stocken took a Renault Avro to Brussels last week against a very strong head wind. The Channel crossing took a long time.

The Hall and Brenard Syndicate are now known as Potash and Perlmutter owing to an alleged resemblance of the principals to those well-known characters.—G. D.

Manchester.

Mr. V. N. Dickinson, who will be remembered as one of the Croydon pilots last summer, has joined the Manchester Aviation Company as chief pilot.

That firm opens its season on Saturday with a gala performance at the Aerodrome at Chorlton-cum-Hardy in aid of the local hospitals. The show is to be patronised by the Lord Mayor and enormous crowds are expected. Already more than 10,000 tickets for admission have been sold.

There will be height-judging competitions, parachute descents, crazy flying, joy-riding, etc., complete with bands and refreshments.

Meanwhile some D.H.9s are being prepared for air-taxi work and Avros are being got ready for the show. Those taken will be used subsequently for joy-riding and instruction.

On Wednesday last week Mr. Dickinson flew over to Blackpool and selected a field to be used for joy-riding during the summer and the firm will also work along the coast towns of North Wales.

Stag Lane Aerodrome.

During the month of March the De Havilland Aeroplane Hire Service completed a total of 92 hrs. 52 mins. flying time which compares very favourably with the total of 44 hrs. 5 mins. completed during March of last year. It should also be noted that the above figures do not include Mr. Alan Cobham's present tour to Egypt and the East.

Last month's work included 4 hrs. 57 mins. test flying, 7 hrs. 10 mins. instruction, 12 hrs. 30 mins. photography and 68 hrs. 15 mins. general flying during the course of which the following towns were visited: Coventry, Holyhead, Eton, Lympne, Guildford, Beauvais, Dijon, Marseilles, Manchester, Harrogate, Brighton, Carlisle, Paris, Berlin, Hamburg and Amsterdam.

A New Aerodrome and Gliding Centre.

The South Coast Land and Resort Co. Ltd., the founders of the town of Peacehaven, near Newhaven, announce that their plans for the development of this town include the laying down of an aerodrome. They have in mind not only the future development of civil aviation, which should find this aerodrome excellently situated for Continental communication, but also the prospects of its use for gliding and sporting purposes.

They state that they are prepared to give all reasonable facilities to anyone desirous of practising gliding, and as the aerodrome is situated in very favourable country for gliding tests, the situation should have many advantages.

The company would be particularly pleased to give facilities for the formation of a gliding club. It will be remembered that Mijnheer Fokker made some successful gliding demonstrations at Peacehaven just prior to the opening of the Itford gliding meeting last autumn.

The Subsidies and Increased Traffic.

It seems that the Civil Aviation subsidy which is intended to encourage Civil Aviation works in a singularly complicated manner which is not fully understood by the uninitiated. In The Aeroplane recently it was remarked that owing to the increase in the number of passengers on the cross-Channel lines the bulk of the traffic would have to go to the foreign lines unless the British firms either acquired more machines or were able to run their machines on the intensive system originated by the Daimler Airway on the London-Paris route.

It will be remembered that for several months last year a single Daimler machine was running four times a day between London and Paris, that is to say, to Paris in the morning and back to Croydon at midday, to Paris in the early

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afternoon and back in the evening. On one occasion at least this same machine did the out-and-home trip three times in the day thus covering about 1,500 miles between daylight and dark.

In those days the subsidy was paid either on the number of passengers carried or on the mileage flown, one forgets which for there have been so many chops and changes, but in any case the more the machines flew the better for the owners. At present the subsidy is not paid on results achieved. That is to say the firms are not paid on piecework. The present subsidy is a lump sum which is supposed to cover overhead charges and so forth and in return for it each air-line has to make a minimum number of flights in the twelve months. Obviously therefore if a firm runs more than the minimum number of trips it is only wearing out its machines and engines and paying for petrol and oil and pilots' mileage at its own expense unless its machines carry on such extra trips enough passengers to pay for running expenses over and above the fixed charges which are already supposed to be covered by the subsidy.

The French firms on the other hand are paid so much a passenger, so much a kilo of goods and so much a trip, besides one believes a lump sum to cover overhead charges. It is quite easy for a nation to do this sort of thing when it makes no attempt to pay its war debts. Consequently the more trips the French air-lines make the more subsidy they get, which at any rate means that the subsidy money goes into somebody's pocket other than the nation's creditors. Under such conditions it is obvious that so far as the British lines are concerned if they were to double their service now they would run out to the number of their minimum flights long before the season was over and then all they would be able to do would be to shut down and let the foreign lines do the whole of the air transport.

Personally if one happened to have the misfortune to be running an air-line that is precisely what one would do, for one can scarcely believe that if one of the British lines ran out to the limit of its subsidised flights about the end of June and then quietly shut up shop the Civil Aviation authorities would be content to see the whole of the air traffic on that line run by foreigners.—C. G. G.

A MASTER MARINER.

Those who have admired the sporting interest which Mr. Alan Butler has taken in aviation for the last year or more—which means everybody who is at all concerned with aviation—will be interested to know that Mr. Butler has just been successful in passing his examination for his Yacht Master's Certificate. Mr. Butler owns several yachts which he always navigates himself, having obtained his sea-going experience in various disguises on all sorts of ships all the way from acting as a stoker on a tramp upwards. Now he is entitled to navigate his own yachts with a full Certificate.

The examination is in fact a very stiff one, being exactly the same as that for a Master's Board of Trade Certificate barring that service at sea in subordinate capacities is not essential and that it is not necessary to have a knowledge of cargo or of a Master's administrative business. One is told that this Certificate has not been granted to anybody in London for the last four years so that Mr. Butler has thus earned a very distinct distinction.

Doubtless the knowledge of navigation which he has acquired in qualifying for his Yacht Master's Certificate will stand him in good stead when in due course he decides to go for his Air Navigator's Certificate, which presumably he will acquire in due course. When he does so he will then have the distinction of being the first owner-pilot to be also an air navigator.

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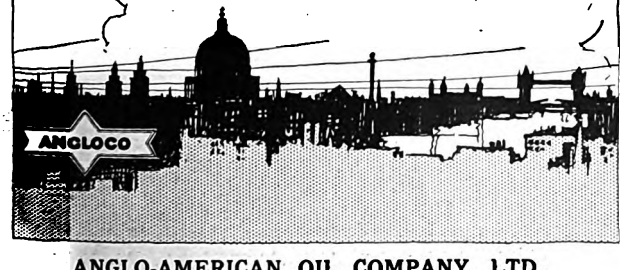

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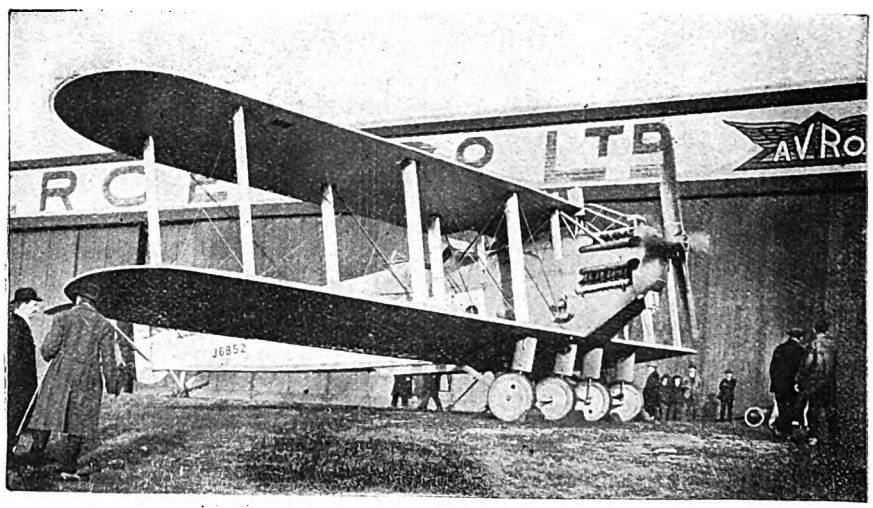

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This Bomber is a further development of the AVRO "Aldershot," which won the Air Force Handicap at the last R.A.F. Pageant. It is fitted with dual control, and the whole of it, with the exception of certain parts of the wings, is constructed of metal. The wings are designed to fold back so as to economise space when the machine has to be stored.

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APRIL 25, 1923.

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ON THE AIRCRAFT TRADE AND AIR POLICY.—III.

Having shown to some extent how some people in the Aircraft Trade regard the effect on aircraft constructors and on the progress of design of what is commonly called the "Million Pound Monopoly Company" we may now proceed to discuss some individual views. But first of all there are certain aspects of the proposed company itself which deserve discussion.

One point is that though it is commonly called the "Million Pound Monopoly," there is not in fact any definite statement in the report of the inquiry committee—usually called the Hambling Report—that the capital of the proposed company must be £1,000,000 all at once or that the Government should necessarily make the subsidy £1,000,000. Apparently a million was mentioned as a nice handy figure for discussion among City Magnates, more or less on the principle of "Think of a number; double it"; etc., etc.; "take away the number you first thought of," and so forth.

The idea in the report rather seems to be that there ought to be a million to be had on both sides (the Capitalists' and the Government's) if necessary but that it may be put up in smaller amounts as and when required. People who know a good deal about air transport say that £100,000 would be ample for a start.

Another point which is causing much argument in the Trade and in what one might call aero-political entourages at the moment is that persistent rumour that the whole affair has already been arranged and that the official invitations to tender for the formation of the company are only matters of form. The casual mention of a million in the Hambling Report (it is surprising how disrespectful these high financiers are to these vast sums) naturally recalled the £1,000,000 which was fixed after due and careful consideration as the capital necessary for the big scheme proposed by Mr. Holt Thomas after the shutting down of Air Transport and Travel Ltd. in 1920. So of course people began to think that there was some relationship between the two different million-pound schemes and after a while assumed that the Hambling scheme was Mr. Holt Thomas redivivus.

Sir Sefton Brancker was the operating chief of Air Transport and Travel Ltd. so people assumed that he would necessarily be chief of the revived million-pound scheme. Hence doubtless the rumour that in the event of the Hambling Report scheme coming through Sir Sefton will resign his official position as Director of Civil Aviation and become managing director of the Monopoly Air Line. The rumour was possibly strengthened by the fact openly admitted that if conditions were agreeable the same moneyed interests which were prepared to back the original Holt Thomas scheme were prepared to back the Hambling scheme.

It is rather a pity that no official statement has been made on this matter for it must necessarily cramp the style of everybody concerned with any new air transport scheme when they are not quite sure whether they are dealing with a permanent Director of Civil Aviation or with a prospective Director of a Monopoly Air Line. Admittedly General Brancker (who is not a permanent Civil Servant) has every right to consider any personal proposal put to him by any commercial interests for he has the immediate precedent of Mr. Kellaway, our late very competent Postmaster-General, who became an official of the Marconi Company almost immediately his Party went out of office, and there are plenty of greater and lesser precedents in the past.

General Brancker has shown himself eminently suited to deal with those who are financially and practically interested in Civil Aviation. And but for the fact that his advent as chief of the Monopoly Air Line would result in the extinguishing of the chiefs of the existing air-lines doubtless the latter would be delighted to welcome him as one of themselves. He has certainly done more during the past year to "get a move on" Civil Aviation than his predecessor General Sykes did in his whole term of office. Either as an Air Ministry official directing the operations of the Million-Pound Monopoly Company in the way the Air Ministry thinks it should go or as an official of the said Monopoly Company directing it in accord with Air Ministry policy one feels sure that he will be of high value to Civil Aviation, but one wishes that one knew the precise side of the official fence on which he intends to make the last hop of his landing.

Meantime further rumours from the City say that those who have been going round trying to beat up enough hard cash, and enough reliable guarantees of more to come, to form definitely a Monopoly Air Line under the Hambling Report scheme are not meeting with an enthusiastic reception. The bursting purses which are crying out to finance Civil Aviation seem to be closely related to Mr. Lloyd George's "bursting cornbins of Russia."

The City's money seems to be busy financing sound industrial and engineering schemes. And doubtless it will soon be available for aircraft firms which have big R.A.F. contracts in hand. But it is not exactly being poured forth recklessly for the benefit of Civil Aviation even with the Monopoly subsidy as a bait.

As a recent official communiqué made clear, the Air Ministry cannot leave the Monopoly proposal open indefinitely and it seems that a close time for the stalking of financiers for this scheme will be declared as from July 31. Apparently the only thing to do is to sit still till then and see whether somebody quite new to aviation puts up a new scheme or whether the existing air-lines form a combine and put up a scheme of their own or whether the group introduced by Mr. Holt Thomas in 1920 revives itself or whether the whole thing falls through and the Air Ministry is forced to carry on the existing air-lines by means of some sort of premium-bonus subsidy instead of the present ridiculous scheme.

Personally one awaits developments with a perfectly impartial mind for one is convinced that no matter what course is taken it cannot for at least three years to come have any material influence on (a) the welfare of the R.A.F. which is our First Line of Defence, or (b) the Aircraft Trade on which depends the supply of war machines with which the R.A.F. will have to defeat our enemies. And by that time we shall probably be boiling up nicely for our war with Russia.

During the War 1914-18, before the United States Government decided what to do about it, a witty American remarked:—"In the United States we are so darned neutral that we don't care which of the Allies whacks Germany." Much in the same way one is so darned neutral that one does not care which scheme gets the Monopoly Subsidy so long as the Aircraft Trade ultimately gets the money and the R.A.F. benefits by getting better machines.

That being so we may now turn to the opinions of people in the Aircraft Trade who have been good enough to express themselves on paper for the benefit of readers of THE AEROPLANE. A good many people whose opinions would have been worth reading have excused themselves from committing themselves either for political reasons or as a matter of policy (which are not the same thing) or because they prefer to wait and see. But happily one has been able to collect a number of very interesting views.

The first opinion is that of Colonel Frank Searle who is entitled to first place by virtue of having been the first to introduce into Air Transport modern intensive transport methods. The high efficiency of the Daimler Airway under Colonel Searle and Major Woods Humphrey has introduced new factors into air transport problems.

When they began sending one machine to Paris and back twice a day (that is to say four cross-Channel trips) and kept on doing it day after day other people thought it enough to send a machine to Paris one day, bring it back the next and call it a week's work. And on top of doing approximately 7,000 miles a week with one machine instead of the usual 500 miles or so they proved that after 120,000 miles that same machine (a De Havilland 34 with Napier engines) was just as good as when it started. Thus they proved the capability and the durability of aeroplanes as transport vehicles and so contributed valuable research data as well as mere commercial figures.

Here then is what Colonel Searle has to say:—

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POINTS ON THE NEW SCHEME FOR GOVERNMENT FINANCIAL ASSISTANCE TO A CIVIL AIR TRANSPORT COMPANY.

"In my opinion this is the first real constructive Report that has been issued on Civil Air Transport. By reason of the fact that the Committee was constituted of prominent business men with no war-flying experience to fog their perspective they have been able to see the difficulties and faults which have existed in the past and have made a particularly clear and common-sense recommendation for the benefit of Civil Aviation in the future.

"I am more than glad to see that they have approved of the system of intensive flying which has definitely proved the possibility of halving the present cost of flying and which has made flying many times safer. To get their approval on this subject from the facts which were placed before them is a very great step in view of the very severe criticism which was hurled at me when it was first suggested, not only by the other transport companies but also by those who had been for long periods connected with flying.

"The new scheme (as stated by the Committee) that a new Company be formed which shall, or may, ignore the present Companies is to my mind the only way to tackle the question by reason of the fact that at the present time the views of the three Companies now operating the services are so diverse as to methods of operating that it is quite impossible to bring us together as a concrete body.

"There are, however, many difficulties to be overcome which are not touched upon in the Report, and I trust that these difficulties will be discussed and settled by hard-headed business men with the same type of mind as those who have submitted the present Report and not by men with war-flying associations only.

"The main difficulty of which I speak is the fact that in the new scheme the Government still offers a lump sum in the way of subsidy (although spread over a period of years) which is the main fault of the present subsidy scheme, that is to say that once a lump sum is given by the Government, whether spread over a number of years or not, a minimum number of miles must be specified—for instance the present three British Companies are to-day flying approximately 2,000 miles a day and have fifteen machines on their strength to do this, while my Company could easily fly these 2,000 miles per day with four machines.

"I therefore maintain that the Government could not see its way clear to grant any new Company a subsidy of £100,000 per annum to fly only 2,000 miles per day, and it accordingly becomes a question for the Government to settle the minimum number of miles to be flown for this average of £100,000 per annum for ten years. Any new Company therefore will attempt to fly only its maximum number of miles with as few machines as possible in order to curtail the cost of flying, this by reason of the fact that the traffic on any new route is an unknown quantity.

"If an average of 500 miles per day per machine are flown the total cost should be reduced to 32 pence a mile. The average traffic of almost any transport company operating on sea and land is somewhere in the neighbourhood of 50 per cent. load for the year. If this is a fact a ten-seater aeroplane would only carry an average of five passengers. Such a transport Company when thoroughly established would only average an income of 30 pence per mile say at sixpence per passenger mile, and one must realise that sixpence per passenger mile is approximately three times the rate of normal first-class travel in any other form of transport. Does the traffic exist at such a price?

"If it is decided that traffic exists not at sixpence per passenger mile but only at fourpence per passenger mile any difference must be made up by drawing upon the subsidy. In the first years of the Company's existence they certainly cannot budget for a 50 per cent. load all the year round—in my opinion it will not average 30 per cent. It is on some basis of this sort that calculation must be made. Such points to my mind are by far the greatest problems which those who settle this subject have to overcome.

"It is suggested that the capital of this Company is £1,000,000 of which the first £500,000 shall be subscribed. I am not quite clear in my mind as to why the Committee made this recommendation unless they had in mind the employment of a large number of machines doing an enormous daily mileage. For instance ten thousand miles a day, or five times the mileage of the present three Companies, could be done with twenty machines

"These certainly would not cost more than £120,000 and the other capital expenditure could only be a small proportion of this sum, and to have to attempt to pay interest on £500,000 would be a very serious charge to the Company.

"This again is a point which will have to receive very serious consideration, but when the Company is formed I do trust that those responsible for its future will be men of sound business capacity of the highest order and that it will not be left in the hands of flying experts, since the services of the latter can always be obtained as and when necessary but they should have nothing to do with the commercial welfare of a company with such a difficult transport problem to solve.

"In conclusion may I venture to hope that in any new scheme the administration of Civil Aviation at the Air Ministry will continue as at present constituted since they have very largely contributed to any distinct progress that has been made during the past year by their very broad-gauge views of the difficulties of the subsidised Companies."

(To be continued.)

IN MEMORIAM.

"THE RED AIR FIGHTER."—Rittmeister Freiherr Manfred von Richthofen's Fokker Triplane on which he was brought down in an aerial combat on Apr. 21, 1918, five years ago last Saturday. Von Richthofen was the greatest of all the German fighting pilots. The famous Richthofen "Travelling Circus" for some time operated from the side of "Mossy-Face" Wood (the Bois d'Havrincourt), near Cambrai, and was highly respected by British pilots.

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R.A.F. INTELLIGENCE

Appointments.

AIR MINISTRY, Apr. 17.

GENERAL DUTIES BRANCH.—Wing/Cmdrs H. le M. Brock, D.S.O., G. R. Bromet, D.S.O., O.B.E., and A. H. Jackson, to R.A.F. Staff College, Andover, 1/5, for Staff Course

S/Ldrs. J. C. Quinnell, D.F.C., A. A. Walser, M.C., D.F.C., R. M. Hill, M.C., A.F.C., Sir N. R. A. D. Leslie, Bt., C.B.E., G. W. M. Green, D.S.O., M.C., D. G. Donald, D.F.C., A.F.C., R. M. Bayley, D.F.C., C. H. Elliott-Smith, A.F.C., J. C. Russell, D.S.O., and A. N. Gallehawk, A.F.C., to R.A.F. Staff College, Andover, 1/5, for Staff course; P. A. Shepherd, to No. 3 Grp/H.Q., Spittlegate, 16/4.

F/Lts. D. F. Stevenson, D.S.O., M.C., M. Thomas, D.F.C., A.F.C., J. A. Glen, D.S.C., A. G. Bishop, A.F.C., L. H. Cockey, F. M. F. West, V.C., M.C., and K. L. Harris, to R.A.F. Staff College, Andover, 1/5, for Staff course; C. N. Lowe, M.C., D.F.C., to R.A.F. Depot, 7/4; D. W. Grinnell-Milne, M.C., D.F.C., to Air Section, British Delegation, Paris, 14/4.

F/Os. D. G. Brodie, to No. 4 F.T.S., Egypt, 24/1, for course of instruction; R. O. Riggs, to No. 100 Sqdn., Spittlegate, 10/4, for course of instruction.

AIR MINISTRY, Apr. 19.

GENERAL DUTIES BRANCH.—Group/Capts. A. G. Board, C.M.G., D.S.O., to R.A.F. Depot, pending disposal, 16/4; P. B. Joubert de la Ferté, C.M.G., D.S.O., to Air Ministry, 16/4, on appointment as Deputy Director of Personnel.

Wing/Cmdrs. S. Grant-Dalton, D.S.O., A.F.C., to H.Q., Coastal Area, pending disposal, 16/4.

S/Ldrs. E. H. Sparling, A.F.C., to Air Ministry, 1/5; T. L. Leigh-Mallory, D.S.O., to Air Ministry, 7/5; W. S. Douglas, M.C., D.F.C., and C. W. H. Pulford, O.B.E., A.F.C., to Air Ministry, 1/5; J. C. M. Lowe, to R.A.F. Depot, 1/5; C. F. A. Portal, D.S.O., M.C., to Air Ministry, 10/4; L. L. MacLean, to Air Ministry, 16/4; R. M. Drummond, D.S.O., O.B.E., M.C., to Air Ministry, 12/4.

F/Lts. I. Wanloss-O'Gowan, to Air Ministry, 21/4; W. F. Dickson, D.S.O., A.F.C., to Air Ministry, 1/5; H. Dawes, M.B.E., to No. 24 Sqdn., Kenley, 1/5.

AIR MINISTRY, Apr. 20.

GENERAL DUTIES BRANCH.—Wing/Cmdrs. I. T. Courtney, C.B.E., to Half-Pay List, 4/4.

S/Ldrs. C. G. Tucker, to R.A.F. Depot, 9/2 (non-effective pool).

F/Lts. T. E. B. Howe, A.F.C., to No. 32 Sqdn., Kenley, 1/5; E. O'D. Crean, to Aircraft Depot, Iraq, 11/4.

F/Os. O. E. Carter and J. B. V. Glyde, to Aircraft Depot, India, 11/4; H. A. Anson, to No. 55 Sqdn., Iraq, 23/2, instead of to No. 84 Sqdn. as previously notified; J. B. I. H. Cordes, G. W. Higgs and E. A. Sullock, A.F.C., to R.A.F. Depot, 16/4; J. L. M. de C. Hughes-Chamberlain, to R.A.F. Depot, 23/4; G. M. Knocker, to R.A.F. Cadet College, Cranwell, 18/4, W. H. Poole, A.F.C., M.M., to R.A.F. Cadet College Cranwell, 19/4; C. J. Poole, to R.A.F. Depot, 15/5; S. H. Reynolds, to H.M.S. "Hermes," 1/5; W. J. Cooke, to No. 100 Sqdn., Spittlegate, 23/4; H. W. Iles, to No. 100 Sqdn., Spittlegate, 22/3; H. S. R. Burt, to No. 39 Sqdn., Spittlegate, 23/4.

P/O. R. C. Harrison, to No. 84 Sqdn., Iraq, 23/2, instead of to No. 55 Sqdn. as previously notified.

From "*The London Gazette*."

AIR MINISTRY, Apr. 10.—Gen. Duties Branch, F/O S. E. Storrar is granted a perm. commission in the rank stated (June 7/1920).

AIR MINISTRY, Apr. 17.—F/Lt. C. N. Lowe, M.C., D.F.C., is granted a perm. commission in the rank stated (Jan. 12/1921).

From "*The London Gazette*," Apr. 20.

RESERVE OF AIR FORCE OFFICERS.—CLASS A.—The following are granted commns. on probation in the General Duties Branch in the ranks stated (Apr. 20):—

Flying Officers.—R. C. Armstrong, J. R. Astin, H. H. W. Bean, G. R. Beck, P. A. F. Belton, P. A. A. Boss, L. G. Brazier, H. E. Browne, C. J. Chabot, P. G. Clarabut, J. H. Colbert, W. E. C. Coombs, F. T. Courtney, A. W. Day, R. Duncanson, S. H. Gaskell, H. M. Gibbs, R. C. D'A. Gifford, J. L. S. Gill, G. T. Griffith, J. O. Groves, F. W. Hartridge, E. W. Jordan, J. C. Joynt, M. M. Kaye, W. F. Knight, H. E. W. Macandrew, J. L. Mayer, L. F. Mead, R. R. Money, A. L. Monger, F. G. S. Musson, M. A. Newnham, E. E. Owen, P. Phillips, C. A. Pike, B. C. Rice, E. G. Richardson, F. G. Saunders, J. Stanley, T. F. Steele, D. J. Stewart, R. H. Stocken, S. E. Taylor, N. H. Thackrah, J. W. Thomson, C. T. Travers, T. B. Tully, A. E. Ward, J. G. Weir, H. M. Yeatman.

Pilot Officers.—W. Anderson, T. E. W. Browne, C. Bunch, J. R. Cox, J. Craig, V. N. Dickinson, M. R. Dynes, W. G. A. Freke, J. F. Greenwood, W. Harmston, J. E. Hunt, R. W. Jackson, R. C. Knowles, G. C. D. Lindsay, G. A. Milbank, F. Neale, J. T. Newton, R. Niven, N. J. Nock, W. C. Osborn, W. R. Parkhouse, G. Richardson, A. E. Roberts, C. E. F. Searle, R. A. Seaton, R. R. Spencer, A. J. Stubbings, D. L. Townsend, A. M. Verity, E. J. Wing, G. T. Witcombe.

CLASS AA.—Pilot Officers.—W. J. Beaumont, R. H. Leavey.

AIR MINISTRY, Apr. 23.

GENERAL DUTIES BRANCH.—S/Ldrs. W. A. McClaughry, D.S.O., M.C., D.F.C., to H.Q., I.A., Uxbridge, 23/4; Sir C. J. Q. Brand, K.B.E., D.S.O., M.C., D.F.C., to No. 5 Wing H.Q., Biggin Hill, 20/4.

F/O. F. E. W. Davis, to R.A.F. Depot, 18/4.

The Duke of York's Wedding.

Group Captain H.R.H. the Duke of York, K.G., G.C.V.O., Royal Air Force, has sent the following letter of thanks to Lieut.-Col. the Right Hon. Sir Samuel Hoare, Bt., C.M.G., M.P., Secretary of State for Air:—

"I feel that I really do not know how to express my gratitude for the magnificent wedding present, which I have received from the officers and airmen of the Royal Air Force.

"I accept it with the very greatest pleasure, and ask you to convey to them an expression of my warm and sincere thanks, not only for the splendid gift which they have made to me, but also for the good wishes with which they have accompanied it.

"I appreciate with all my heart the goodwill, which the Royal Air Force have shown towards me, and I wish all the officers and airmen to realise how grateful I am to them for this wonderful token of their loyalty and generous feeling."

Short Service Commissions.

There has been a rumour in Service circles to the effect that a new scheme is coming into operation whereby the length of service for those holding short Service commissions has been extended to ten years or that a further period of ten years will be allowed to those who have served their present period. It is further being rumoured that at the end of the said period officers will be granted a gratuity of one thousand pounds.

One has it on the authority of the Air Ministry that this rumour is utterly untrue. Short service commissions are granted for a period of five years and in a few special cases for seven years with a gratuity of £75 per year's service. No alteration or extension of the scheme is contemplated.—G. D.

The R.A.F. Reserve.

The first list of those posted to the R.A.F. Reserve was published on Apr. 20. The London School opens on May 1 at the De Havilland Aerodrome, Stag Lane. D.H.9s with Siddeley "Puma" and Renault-Avros will be used and Mr. E. B. Wilson and Mr. "Jock" Edelsten will be instructors

The Bristol School will open in about three weeks' time. Presumably the machines used here will be Renault Avros and Bristol "Fighters" though one has no official information on this point. The instructors are to be Major Foot, and Messrs. Uwins and Campbell. The Glasgow and Coventry Schools are not yet complete but it is expected that they will begin operations in the early summer.

Meanwhile all arrangements for the Reserve are proceeding with commendable promptitude and efficiency.—G. D.

The Middle East Dinner.

The Annual Dinner of the "Middle-Easters" R.A.F. is to be held on Derby Day, June 6. Air-Vice-Marshal Sir Geoffrey Salmond, K.C.M.G., C.B., D.S.O., will take the Chair, and it is hoped that all officers now in England who served in the Middle-East Command during and since the War will be present. The Middle East is taken to include Egypt, Palestine, Salonica, East Africa, Gallipoli and Mesopotamia. Officers who served in those theatres of war and would like to attend the dinner are invited to communicate with F/Lt. G. C. Anne, the United Services Club, Pall Mall, S.W.1.

Applications should be made early as the accommodation at the Café Royal is not unlimited and some 60 tickets have already been sold.

Irish Wing Dinner.

The second annual dinner of the 11th Irish Wing will be held at the Hotel Cecil, Strand, on Friday, May 11, 7.30 p.m. for 8 p.m. Dress: Dinner Jackets.

Will those officers who wish to attend, please communicate with S/Ldr. C. J. Mackay, Air Ministry, Kingsway, W.C.2.?

A FINE EXAMPLE.

As this paper goes to press information has been received to the effect that an Aero Club has been formed at Brough by the employees of the Blackburn Aircraft Company. The Club has bought a D.H.6 and the Blackburn Company are giving housing and the use of the aerodrome entirely free of charge. The object of the club is for members to learn to fly.

One commends this excellent example to all other aircraft firms in England.

A $1,000 LIGHT AEROPLANE PRIZE.

A Prize of £1,000 has been offered by the *Daily Mail* for competition by light aeroplanes. The conditions of the Competition are similiar to those laid down by the Royal Aero Club for the Duke of Sutherland's Prize, the difference being that the Duke of Sutherland's Prize is confined to all-British machines where as the *Daily Mail's* prize is open to pilots and machines of all nationalities.

It is hoped that this competition will bring to this country some of the very interesting small German aeroplanes which have been produced recently and some of the French machines of which we have heard so much.

A reference to the manner in which the Prize was announced by the *Daily Mail* will be found on page 307.

THE VICKERS VALENTIA II.

One is informed that the Vickers "Valentia" flying boat, built at Cowes by Messrs. S. E. Saunders & Co., and having two Rolls-Royce "Condor" (650 h.p.) engines is ready for delivery to the Air Ministry, and in fact it was hoped that the machine would be flown to the Isle of Grain on Apr. 23 (Monday).—J. F. S.

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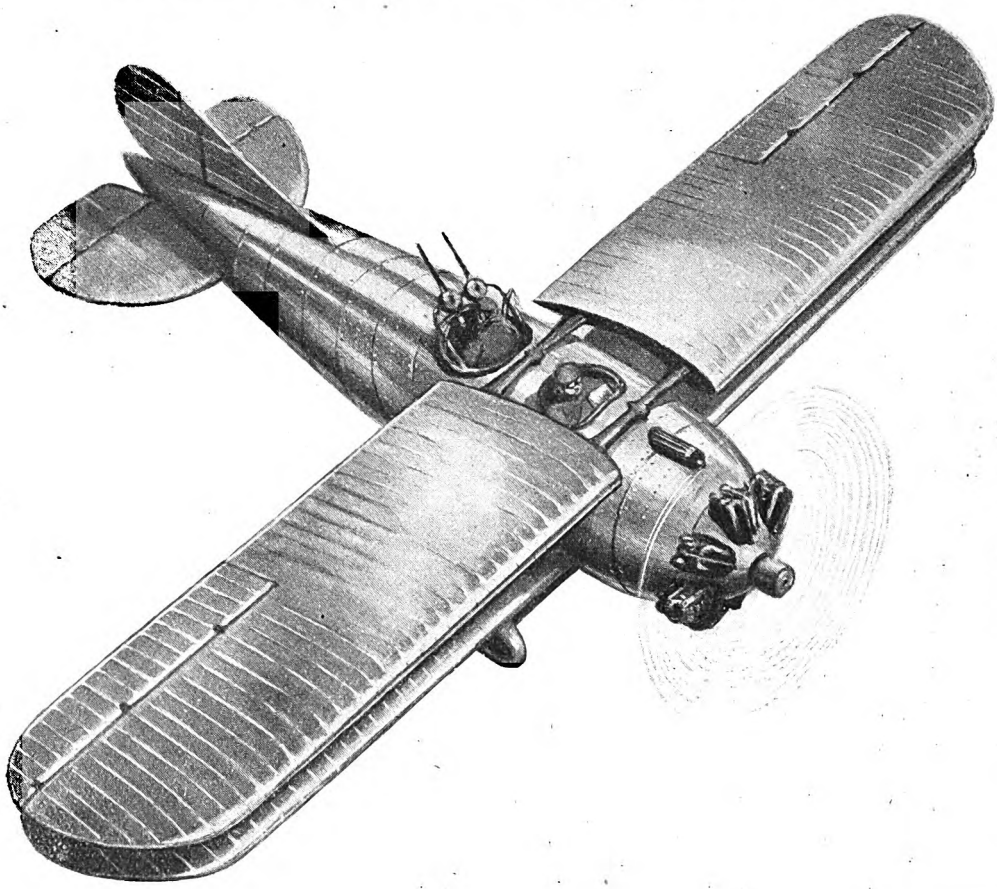
ALL-METAL

AEROPLANES AND SEAPLANES.

Designers and Constructors of All-Metal Aircraft for the British Government.



As a result of the most exhaustive tests carried out by the R.A.F. Factory on the "Short" All-Metal Aeroplane, Messrs. Short Bros. have now received an order for further machines of this type. When completed these machines will be the only All-Metal machines, that is to say, machines complete with metallic surfaces, to be made in Great Britain.

SHORT BROS.

(ROCHESTER & BEDFORD) LTD,

WHITEHALL HOUSE, 29-30, CHARING CROSS, LONDON, S.W.1.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

An amazing but not unnatural *faux pas* by the *Daily Mail* is recorded below.

The general outline of the vortex theory which has recently been published is concluded in an article below, which reviews some of the objections to it which have been raised in this country.

Readers who have been sufficiently interested in this brief and elementary exposition and who wish to go into the theory more deeply can be supplied with the necessary information as to publications dealing with the subject on application to W. H. Sayers at the office of THE AEROPLANE.

An all-Australian Commercial Machine—the first of its kind—is illustrated and described in this issue.

THE LIMIT.

On Apr. 6 it was announced officially by the Royal Aero Club that His Grace the Duke of Sutherland, Under-Secretary of State for Air, had most generously offered a prize of £500 for the longest flight made by an all-British aeroplane on a gallon of petrol with a British pilot subject to certain other conditions. A preliminary notice to this effect was published in THE AEROPLANE on Apr. 4 and the full conditions were published in this paper on Apr. 18 as unfortunately owing to late arrival it was impossible to include them in the previous week's issue.

On Friday, Apr. 20, the *Daily Mail* newspaper came out with the following announcement :—

> "For the encouragement of flying with small motor-power the *Daily Mail* offers a prize of £1,000 open to the whole World.
>
> "The Duke of Sutherland, Under-Secretary of State for Air, offers a second prize of £500 restricted to British competitors flying British machines.
>
> "Both prizes will be competed for in September at a locality in England yet to be selected under the competition rules of the Royal Aero Club."

Which somewhat naturally was followed by an imposing list of the various assorted services which the *Daily Mail* claims to have rendered to aviation.

In the *Daily Mail's* leading article on the same day there appeared the following amazing statement :—

> "To the amount which the *Daily Mail* has offered the Duke of Sutherland has added £500 for British competitors using British machines."

On the face of it the facts of the matter are that the Duke of Sutherland, being the Sportsman that he is, offered a very handsome prize for the encouragement of British light aeroplanes. The *Daily Mail* at a later date was pleased to offer double the amount for International competition.

Under the circumstances any ordinary paper would naturally have been content with claiming for itself the credit of having seconded the Duke's sporting offer by extending the scope of the competition. For a newspaper to adopt a prize already offered by another person and to announce calmly that that person's prize is second to or in addition to its own prize offered at a later date is something new in the ethics of journalism, even as devised by the Harmsworth Press.

Now that the idea has been discovered there is so far as one can see nothing to prevent the *Daily Mail* later in the year from offering a large money prize for the Royal Aero Club's "Round England" Race and announcing that the King's Cup will be given as a second prize in addition to the *Daily Mail* prize.

Presumably a newspaper like a limited company has neither soul to be damned nor body to be kicked and so can scarcely be considered as possessing pretentions to good breeding. But if the *Daily Mail's* action had been committed by an individual one would be justified in calling it the limit in unspeakable caddishness.

If the Committee of the Royal Aero Club wishes to do a right thing, for once, it should make it quite clear in an official statement that there is no connection between the Duke of Sutherland's prize and the *Daily Mail's* offer. And the Club should rule that no single flight should count in both competitions. It is too much to expect the Club to do what it ought to do, namely to refuse to deal with the *Daily Mail* prize at all after such a *bêtise*.—C. G. G.

VORTICISM IN AERONAUTICS.—VI.

By W. H. SAYERS.

The general outline of the vortex theory has now been described in so far as relates to its general application to the wings of an aeroplane. It has also been applied with marked success to the airscrew, which is a special form of aerofoil moving in a spiral path, and leaving behind it a set of spiral trailing vortices.

The effect on the performance of each blade aerofoil of its own and its neighbouring blades system of circulation and vortices is very much that which would occur in a multiplane with a very large number of aerofoils each having a gap equal to the advance per revolution divided by the number of blades of the airscrew itself.

In this special case the calculation of the interference effects is distinctly more complex than in the case of the ordinary aerofoil, but the theory does a good deal towards clearing up the hitherto somewhat vexed question of the "inflow velocity" of the airscrew, and it is claimed that it can be used for practical design work with satisfactory results.

Despite the admittedly satisfactory results which have been attained by the application of the theory to aerofoils and airscrews there remains in this country at any rate a fairly strong reluctance on the part of certain "authorities" on aerodynamics to accept the vortex theory as essentially sound

Mr. Leonard Bairstow is and has been from the days when Mr. Lanchester advanced the theory in its earliest form a leader of this "anti-vorticist" movement, and so far as can be gathered he still remains of that persuasion—although he admits that he is unable to explain why the theory works so well if it is in fact unsound.

For all practical purposes an objection to a theory which does not assert that the theory fails to give correct results has comparatively little weight. The vortex theory does not give a complete explanation of the qualities of a real aerofoil.

Neglecting viscosity, it obviously does not explain any viscous effects, and one may object to it on the score of incompleteness—if one is prepared to provide a more complete theory.

But a theory is only after all the setting out of a set of phenomena in an orderly and co-related form, and the test of a theory is simply does it introduce order into what was otherwise an unrelated statement of experience? If it does with sufficient accuracy for practical purposes, then for practical purposes the theory is to be regarded as valid until it

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can be replaced by one which either covers a greater range of experience or covers the same range with greater accuracy.

On these grounds the vortex theory may be regarded as valid until something either better or more complete replaces it.

One of the most insistent objections to the theory is that it gives no indication of the breakdown of flow over an aerofoil which occurs at the critical angle—or "burble point" of an aerofoil—of the resulting falling off of lift. It may be as well to consider this particular item in a little more detail.

The airflow round an aerofoil in the fluid of negligible velocity follows the profile of the section smoothly as in Fig. 26 A. In the real aerofoil at ordinary angles it does not quite do this. Close to the surface of the aerofoil there are small eddies, forming as it were rollers between the skin of air which sticks to the aerofoil (B). These small eddies are the result of viscosity, and are responsible for some part of the resistance of an aerofoil in a viscous fluid.

The flow round a stalled aerofoil is something like that shown in C of Fig. 26. What is happening is the formation of eddies, really similar to the roller eddies of B, on a greatly enlarged scale. Like the roller eddies these large eddies are the result of viscosity, but in this case they are so large compared to the size of the aerofoil that they cause the general flow round that aerofoil to be greatly changed.

It does not seem exactly fair to blame the incomplete vortex theory for failing to indicate the result of viscosity when the theory expressly neglects viscosity. But it is by no means certain that the vortex theory is incapable of throwing useful light on this phenomenon of burbling.

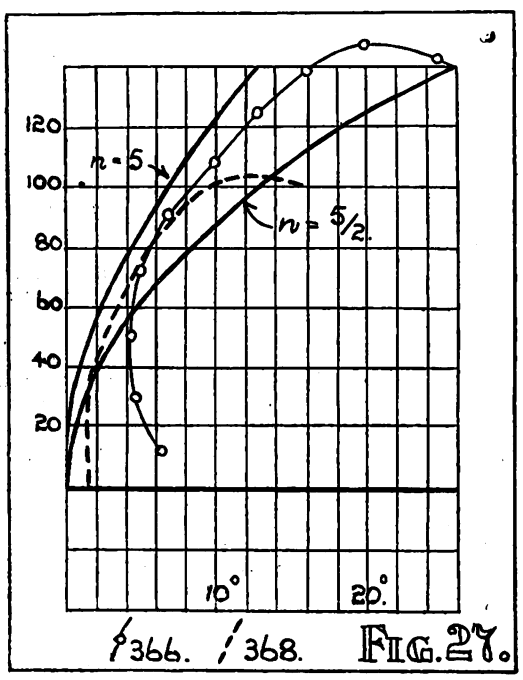
The formation of eddies at the aerofoil necessarily means dissipation of energy—that is to say resistance. In any finite aerofoil, as has already been explained, the production of lift also involves resistance—and the dissipation of energy.

All the energy available for dissipation must be supplied from the stock of kinetic energy in the air-stream flowing past the aerofoil—and on very general principles one would expect that when the energy dissipated in overcoming viscous forces exceeded a certain amount a considerable modification of the flow round the aerofoil would occur.

At zero lift the induced drag is zero, and the total drag is therefore infinitely greater than the induced drag. As the lift increases the ratio of lift to drag improves, and in all good aerofoils the real drag reaches a value of twice the induced drag for the corresponding lift. Theoretically this should be the condition for best L/D, and in practice it is so to a fairly close approximation. As the angle increases the ratio of total drag to induced drag becomes first less than two, and then increases again and always eventually exceeds twice the induced drag.

On general principles one would expect that when the real drag again reached twice the "induced" drag another critical point would be reached.

And in fact examination of a large number of aerofoils shows that the curve of real drag crosses the curve of twice the induced drag at some position very close indeed to the stalling angle.



366. 368. FIG. 27.

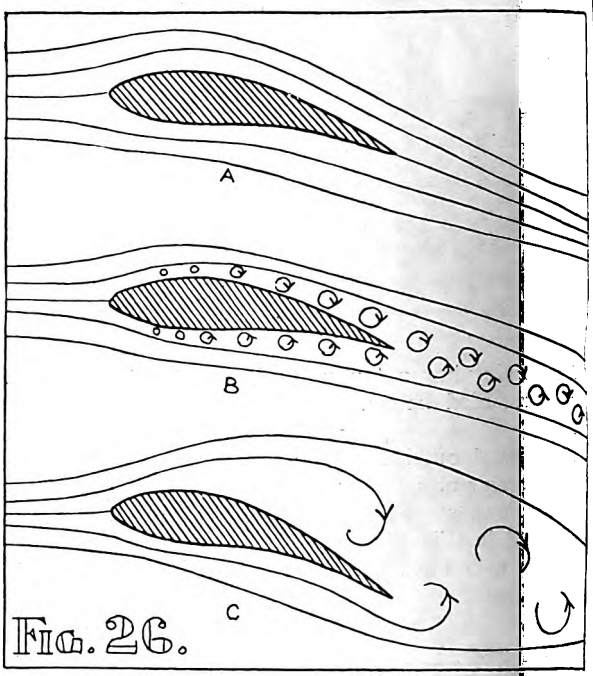


FIG. 26.

The actual drag at the observed maximum lift coefficient is for many aerofoils quite considerably less than twice the induced drag. But the drag is always increasing very rapidly when it reaches the neighbourhood of twice the induced drag, and if polar curves of aerofoils are plotted over a polar curve of twice the induced drag for the appropriate aspect ratio, the aerofoil curve crosses the double-induced drag curve very near to the critical angle.

In Fig. 27 the two extreme curves marked $n = 5$ and $n = 2\frac{1}{2}$ are the curves of induced drag for an aerofoil of 5 and of $2\frac{1}{2}$ aspect ratio. The second curve is therefore one of twice the induced drag proper to an aspect ratio of 5. The dotted and the circle-marked curve are characteristics of two entirely different aerofoils of aspect ratio 5. It will be seen that these two curves cross the $n = 2\frac{1}{2}$ curve at a lift coefficient not far from the maximum of the respective wings.

This rough rule breaks down entirely for certain aerofoils—such as some thin-strut sections whose initial drag at zero lift is so high compared to the slope of the lift curve that the drag is always more than twice the induced drag. This is not particularly surprising for it is the second point at which the relation holds which constitutes the critical or stalling condition, and as the first—or best L/D condition—is not achieved the second point is never reached. And as a matter of fact these sections do not appear to have a critical angle of the type found in normal aerofoils.

One result of any rule of the type suggested above is that the maximum lift of any given section will fall off as the aspect ratio increases, and that at the same time the position of maximum L/D and of stalling-point will approach one another. As a matter of fact there is fairly good evidence that this does occur to some extent, certain aerofoils tested under "infinite aspect ratio" conditions showing the maximum L/D at values of lift very fairly close to the maximum. For instance the aerofoil whose characteristics were shown in Fig. 13 tested with partitions at its ends has its maximum L/D ratio at a lift coefficient of about 80 per cent. of the maximum. Incidentally it stalls at a point which indicates that according to the rule above mentioned it has a real aspect ratio of 14.5 instead of one of infinity.

It is not suggested that this rule connecting stalling with the development of a resistance equal to twice the induced drag can be regarded as one to be relied upon in all cases, but the general run of the evidence is that there is some definite relation between the frictional or viscous resistance and the theoretical induced drag which leads to a breakdown of flow and is the cause of stalling.

Thus although the vortex theory does not in itself provide an explanation of stalling it is quite possible that it will lead to the discovery of some such relation, and so throw light upon this rather important phenomenon.

An objection of a somewhat more abstruse nature has also been advanced by certain British aerodynamicists. In the mathematical development of the theory it has been assumed that the vortices which trail behind the wing flow straight back—at right angles to the span. Now as an observed fact

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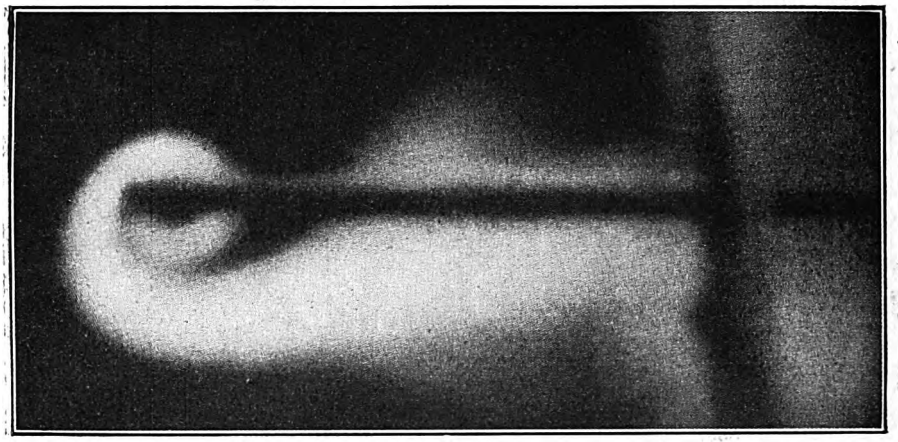


A PHOTOGRAPH OF A WING-TIP VORTEX.—This photograph, reproduced from a report of the American Advisory Committee for Aeronautics, was taken in a small very high-speed wind-tunnel. In certain conditions of temperature and humidity it was found that the water-vapour in the air condensed as a result of the disturbance in the vortex, and the vortices could thus be seen and photographed.

the disturbance behind the wing is not strictly so arranged, and it is held that departure from this rectangular distribution of the vortices invalidates the whole of the mathematical development of the theory.

This appears to be an academical objection of very little real importance. For what is in question in practice is the gross effect of the disturbance caused by any given wing in producing "induced drag."

There is a definite value for the induced drag caused by any arrangement of trailing vortices, and this actual induced drag can be equated to that which would be produced by a particular rectangular arrangement.

The conventionalised rectangular arrangement of vortices lends itself more readily to mathematical treatment than does a more complicated system such as pretty certainly occurs in practice, but the experimental evidence seems to show pretty conclusively that to within a fair degree of accuracy the real arrangement differs little in its effects from the equivalent rectangular arrangement which has been assumed for the purpose of calculation.

As a matter of fact there is some very considerable reason for suspecting that the reluctance shown in certain British circles to an acceptance of the vortex theory is of the nature of an attempt at face-saving for, as has already been recorded, when Mr. Lanchester first published the general statement of the theory certain eminent lights of the N.P.L. to all intents and purposes ridiculed his suggestions. It is from the same quarters that the main objections to the theory are still raised.

[THE END.]

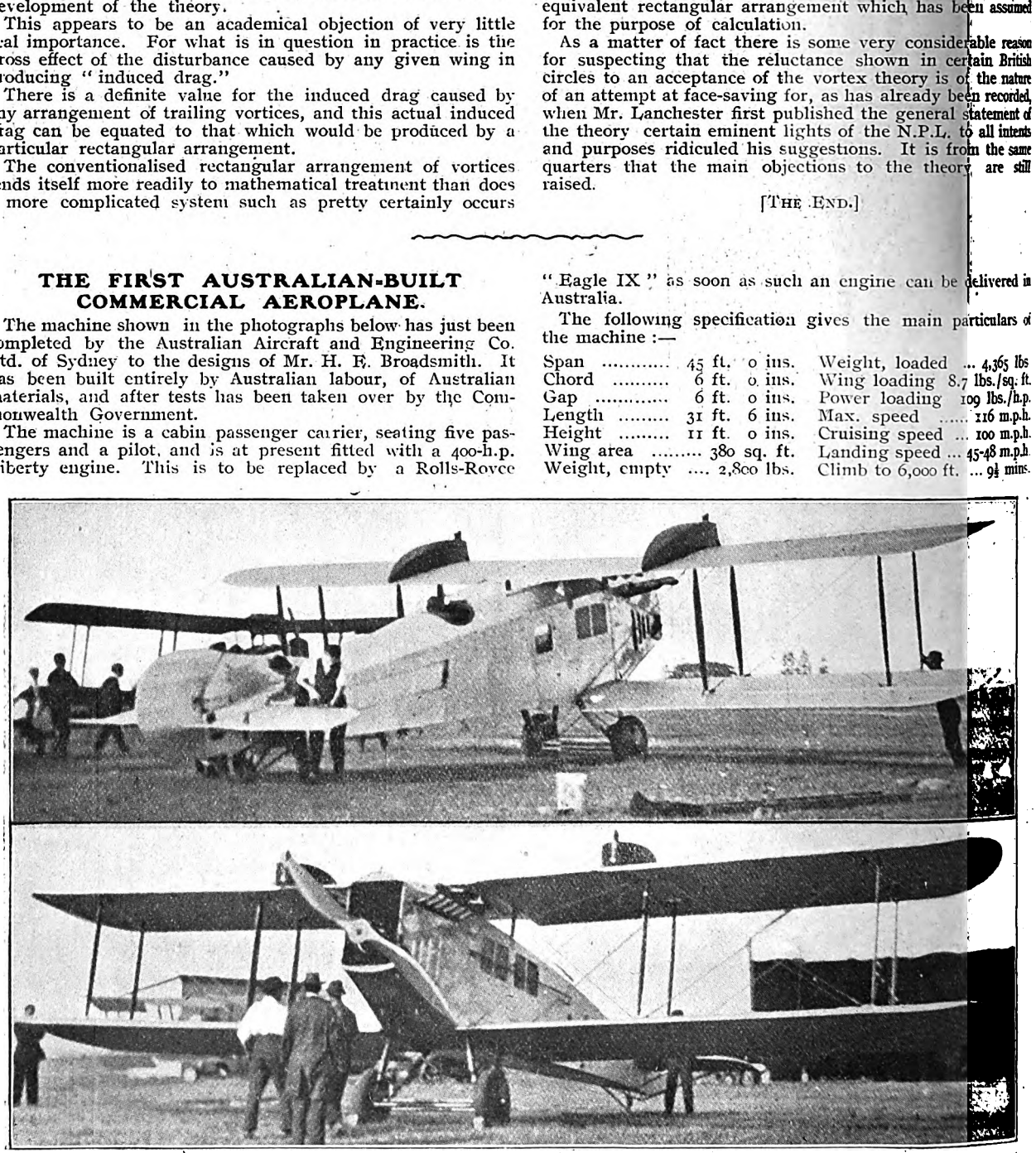
THE FIRST AUSTRALIAN-BUILT COMMERCIAL AEROPLANE.

The machine shown in the photographs below has just been completed by the Australian Aircraft and Engineering Co. Ltd. of Sydney to the designs of Mr. H. E. Broadsmith. It has been built entirely by Australian labour, of Australian materials, and after tests has been taken over by the Commonwealth Government.

The machine is a cabin passenger carrier, seating five passengers and a pilot, and is at present fitted with a 400-h.p. Liberty engine. This is to be replaced by a Rolls-Royce "Eagle IX" as soon as such an engine can be delivered in Australia.

The following specification gives the main particulars of the machine :—

Span	45 ft. 0 ins.	Weight, loaded	4,365 lbs
Chord	6 ft. 0 ins.	Wing loading	8.7 lbs./sq. ft.
Gap	6 ft. 0 ins.	Power loading	109 lbs./h.p.
Length	31 ft. 6 ins.	Max. speed	116 m.p.h.
Height	11 ft. 0 ins.	Cruising speed	100 m.p.h.
Wing area	380 sq. ft.	Landing speed	45-48 m.p.h.
Weight, empty	2,800 lbs.	Climb to 6,000 ft.	9½ mins.



The Australian Aircraft and Engineering Company's 5-seater commercial machine.

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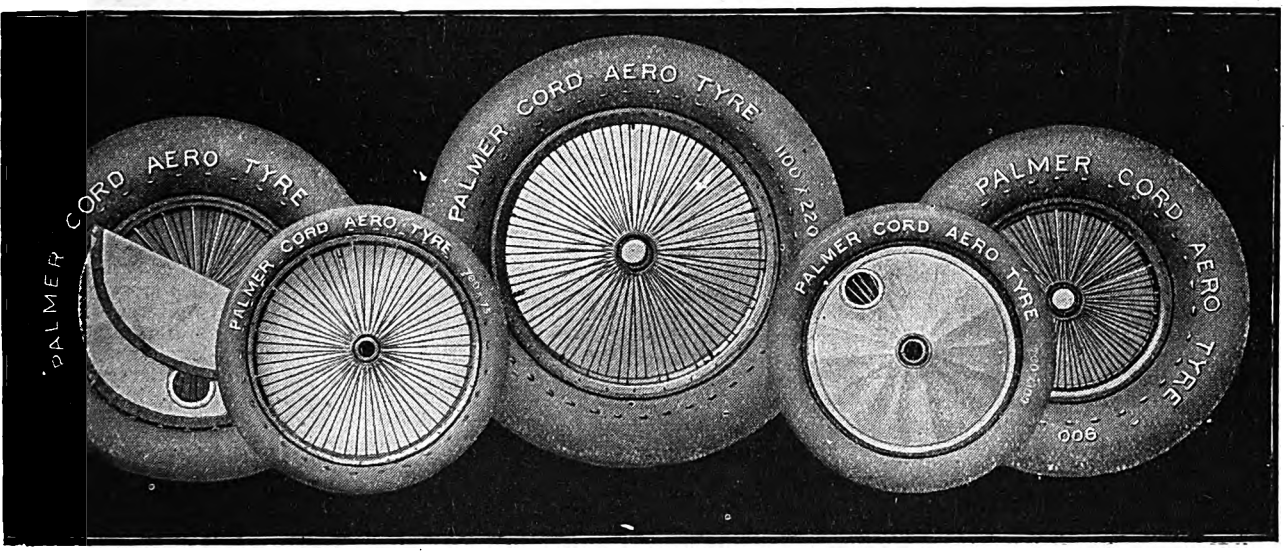
PALMER

LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	96	178.	55.	132/46	1000×150	209	185.	55.	Central
,,	17	72.39	12.7	Central	,,	99	178.	38.89	132/46	,,	210	185.	60.32	Central
					,,	112	150.	38.09	Central					
450×60	30	89.	31.75	Central						1000×180	148	220.	80.	Central
,,	138	130.	38.09	Central	650×125	119	178.	55.	132/46	,,	149	185.	55.	Central
					750×125	77	178.	44.45	132/46	,,	155	220.	66.67	Central
575×60	21	160.	28.	Central	,,	92	185.	55.	135/50					
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	900×200	107	185.	55.	Central
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	108	185.	55.	1 25/60
					,,	99	178.	38.89	132/46	,,	128	220.	66.67	Central
600×75	21	160.	28.	Central	,,	112	150.	38.09	Central	,,	137	250.	80.	Central
,,	34	150.	31.75	104/46						,,	202	185.	60.32	Central
,,	111	150.	38.09	104/46	800×150	82	185.	55.	135/50					
					,,	85	185.	55.	Central	1100×220	134	220.	66.67	Central
700×75	78	178.	44.45	132/46	,,	36*	185.	55.	135/50	,,	136	250.	80.	Central
,,	79	178.	44.45	Central	,,	40*	185.	60.32	135/50					
,,	100	178.	38.09	132 46	,,	152	185.	66.67	135/50	1250×250	133	250.	80.	Central
,,	101	178.	31.75	132/46	,,	163*	185.	66.67	135/50	,,	154	304.8	101.6	Central
					1000×150	131	220.	66.67	Central					
700×100	77	178.	44.45	132/46	,,	102	185.	55.	125/60	1500×300	115	304.8	101.6	Central
,,	92	185.	55.	135/50	,,	141	250.	80.	Central	,,	126	304.8	152.4	Central
,,	95	185.	55.	Central	,,	201	185.	60.32	125/60	1750×300	139	400.	152.4	Central

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THE INSTITUTION OF AERONAUTICAL ENGINEERS.

On Thursday, Mar. 12, Mr. F. T. Hill, A.F.R.Ae.S., read a paper before the Institution on "Some Controversial Points as to Aircraft Design."

Mr. Hill generally took the view that the detail design and construction of present aeroplanes was very largely a legacy of war practice and that it might be well to review such design in the light of present-day requirements—particularly as regards the construction of machines for civilian service.

The lecturer discussed fuselage construction and divided fuselages roughly into the braced-girder type and the monocoque, or solid-skin type. The girder fuselage was probably lighter, because each member could be correctly proportioned for the load it had to carry. It was fairly cheap to build and to repair. On the other hand for commercial machines it presented difficulties as to cabins clear of bracing and to the fitting of reasonable-sized doorways.

The skinned type required a higher degree of craftsmanship in construction, but gave opportunities for clear cabins and respectable doorways.

Most commercial machines were very inadequately supplied with doors for loading goods—and if goods traffic on any scale was to be successful the question of loading required to be carefully considered. The lecturer suggested an opening in the bottom of the fuselage and a strengthened roof to which lifting-tackle could be attached as the ideal arrangement for loading goods. Mr. Folland's arrangement of a folding fuselage had also great advantages.

During the war the Air Ministry had demanded removable engine mountings. Such mountings were now available, but in civil work—so far as Mr. Hill's experience went—people who had these mountings still took the engine out of the mounting when an overhaul was necessary. He thought this was largely due to the fact that modern engines were much easier to take out of or put into their mountings than older types, and that the removable engine mounting as a whole was usually a clumsy thing to handle.

Petrol systems had been a subject of much controversy. The gravity system was obviously the simplest, but it was rarely possible to use it. The engine was rarely much lower than the highest possible position for the tank, and the tank usually was some way behind the engine. There was little available head anyhow, and if the machine had to climb at a steep angle the head usually disappeared.

The pressure system was condemned during the war owing to the risk of loss of pressure if any part of the system were damaged, and the petrol-pump took its place. But for peace-work he thought the pressure system was preferable to the petrol-pump.

The lecturer dealt with a number of other details in a similar manner, and the paper was followed by a discussion.

SOFT RECORDS BROKEN.

On Mar. 30 at Etampes the 500 km. and the 1,000 km. records were broken. Lieut. Carrier flying a Breguet 14A2 (300-h.p. Renault) and attacking the 1,000 km. records over the Coupe-Deutsch Course, covered the 100 km. in 39 mins. 41 secs., the 500 km. in 3 hrs. 19 mins. 13 secs. and the 1,000 km. in 6 hrs. 39 mins. 40 2-5 secs., having covered 10 circuits of the course at an average speed of 152.671 km.p.h. The previous record was held by M. Bossoutrot on a Farman "Goliath," who in June, 1920, covered the 1,000 km. in 10 hrs. 19 mins. 46 secs.

At the same time Lieut. Batalier after the 500 km. record on a Henri Potez S.E.A. (400-h.p. Lorraine-Dietrich) covered the 100 km. in 32 mins. 55 secs. and the 500 km. in 2 hrs. 42 mins. 51 3-5 secs. This record was also held previously by M. Bossoutrot on a Farman F90 with 3 hrs. 35 mins. 36 secs.

These records were and still are particularly "soft." They were made on the old Goliath and though all records up to 300 kms. have been beaten over and over again in the Gordon-Bennett Cup, Deutsch Cup and Pulitzer Trophy races nobody has thought it worth while to go on for the further hundreds of kilometres. Even now it ought to be possible to put up the 500 km. to 170 m.p.hr. and the 1,000 km. to 150 m.p.hr.

Since then it has been reported that on Mar. 31 Lieut. Pearson of the U.S. Army Air Service on a Verville-Sperry monoplane (400-h.p. Wright) covered the 500 km. in 1 hr. 50 mins. and Lieut. Harris on a D.H.4 (400-h.p. Liberty) the 1,000 km. in 4 hrs. 52 mins. both at Dayton, Ohio.

The two American attempts were made over a measured course at McCook Field, Dayton, Ohio, and were officially observed.

Mr. Pearson flew at a speed of 167.8 m.p.h. compared with M. Batelier's 115 m.p.h. and Mr. Harris's record was set up at 127.42 m.p.h. as against M. Carrier's 93 m.p.h. All these flights were made by military pilots flying on military aircraft.

So far no R.A.F. pilots have been permitted to go for records on R.A.F. machines.

A WIRELESSLY-CONTROLLED AEROPLANE.

Tests with aeroplanes flying under wireless control have been in progress in France for some years past and from announcements which have recently appeared in the lay Press it would appear that considerable progress has been made.

The experiments have been made under the auspices of the Section Technique, and the machine employed for the purpose is one of the old Voisin-type pushers.

The machine is equipped with an automatic gyroscopic stabiliser, and is fitted with rudder and elevator controls which are operated through relays as the result of wireless signals received on the machine.

So equipped a number of successful flights have been made during the last few years, but it has always been necessary for the pilot to intervene for landing purposes.

The machine has now been fitted with a hinged rod some 12 ft. long, hanging below the undercarriage and coupled up to the elevator so that when the rod touches the ground the machine is automatically "flattened out."

On Apr. 10 last, at Villacoublay, the machine was flown with two passengers and with the pilot's control sealed, the whole flight being controlled by wireless plus the landing stick. The trial appears to have been quite successful.

It should be pointed out that the landing arrangement is nothing other than the Cooper night-landing stick, devised and developed by Major "Queenie" Cooper at Felixstowe during the war, and successfully used on the large "F" type flying-boats.

"REFER TO DRAWER."

One of the jokes of recent date has been the excitement in certain papers about the sale to Germany of aluminium scrap presumably from the breaking up of old airships at Howden, the contents of the Station there having been made over to the Disposals Board some time ago. One paper actually suggests that this material can be used again in the construction of the new super-Zeppelins which are being built at Friedrichshafen.

Anybody who has ever seen the British Workman at work dissembling aircraft parts can imagine how fit the delicate girder work of an old Zeppelin would be for anything except the melting-pot after he had done with it. One paper, a trifle more sensible, says that the airship scrap will be used for the making of aluminium tins (*sic*), pans, thermos flasks and other articles.

Still the idea of returning all this strip aluminium to the original drawers is quaint. It reminds one of the Naval officer who seeing a looping model aeroplane for the first time remarked "Marvellous! Comes back to the hand every time, just like a cheque."

A FINE COLLECTION.

It is interesting to know that when the exhibits now at the Imperial War Museum at the Crystal Palace are evicted from that building, as they will be some time this year, the aeronautical section will be moved bodily to the new Science Museum at South Kensington.

One believes that the whole exhibition will be completely installed at South Kensington by October of next year. The collection of aeronautical war material got together at the Crystal Palace is undoubtedly the finest thing of its kind in the world. Certainly nowhere else is there such a collection of aero-engines of all types. The South Kensington Museum already has a very fine aeronautical section of its own, which comprises many interesting exhibits of the pre-war period, and when to these is added the exhibits from the Crystal Palace it is certain that it will be the finest historical show of aeronautical material in the world.

TO ENTHUSIASTS.

Herr Alfred Businski, of 11, Tauroggenerstrasse, Charlottenburg bei Berlin, writes that he will be glad to get into touch with aeronautical enthusiasts in this country, and would like to receive from all firms interested in aviation any literature which they may publish concerning their machines. Herr Businski is, one gathers, a young man who served during the war in the German Infantry, but is a personal enthusiast for aviation. In 1920 he inaugurated what he calls the "Internationalen Aeronautischen Centrale," which he hopes to develop as an information and propaganda bureau. The idea is certainly one to be encouraged, and certainly no harm can come of giving Herr Businski as much information as is available about British commercial aircraft.

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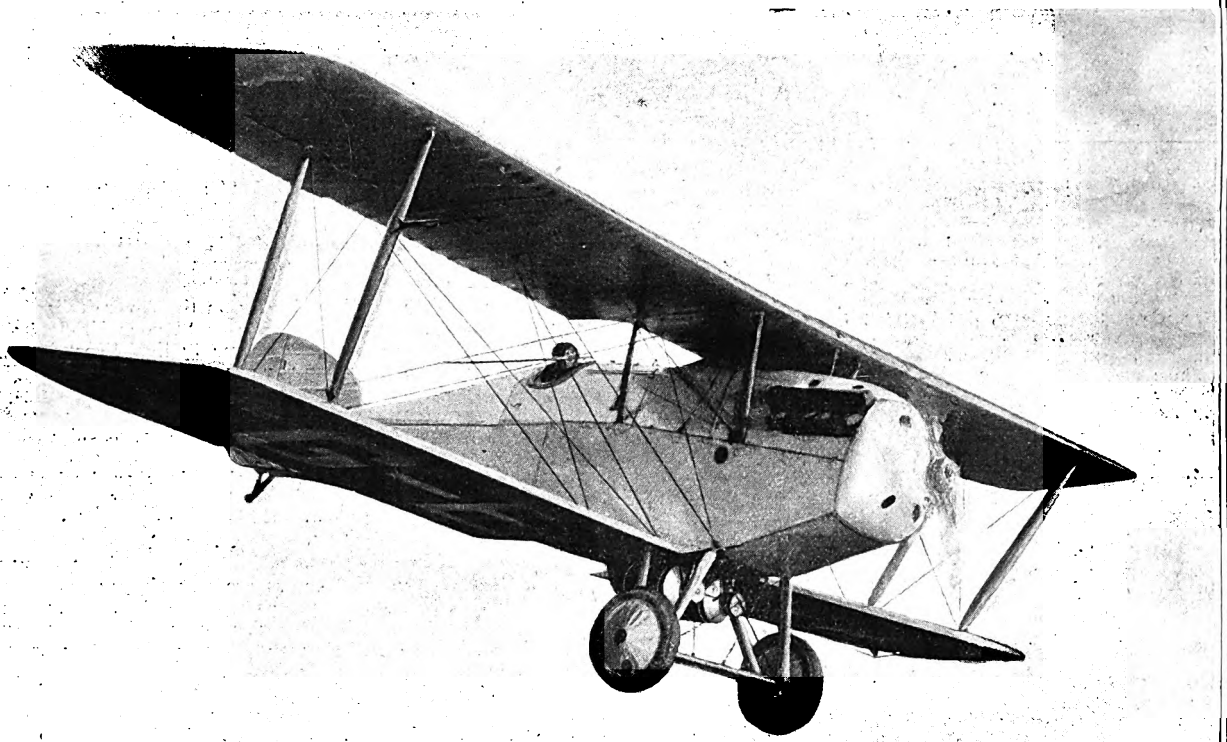
An A.D.C. Martinsyde F4.



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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 17; Tuesday, 17; Wednesday, 13; Thursday, 14; Friday, 16; Saturday, 11; Sunday, 5.

LONDON—PARIS:

Handley Page Transport, Ltd., machines, 20*, passengers 79, freight 3,819 lbs.; Air Union, machines, 24†, passengers 79, freight, 17,723 lbs.; Total machines 44; passengers 238.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 16*, passengers 76, freight —

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 21, passengers, Manchester-London, 15, London-Amsterdam, 18, freight—.

LONDON—ROTTERDAM:

K.L.M., machines 12, passengers 19, freight —.

Total number of trips by British machines: 57, carrying 268 pas. Foreign machines: 36, carrying 98 pas

STATISTICS

For week ending April 22:—

Machines, 93; Passengers, 366; Crews, 153; Total Personnel, 519.

Corresponding week last year:—

Machines, 96; Passengers, 171; Crews, 149; Total Personnel, 320.

Corresponding week, 1921:—

Machines, 55; Passengers, 183; Crews, 70; Total Personnel, 253.

Corresponding week, 1920.

Machines, 44; Passengers, 46; Crews, 46; Personnel, 92.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

Exactly the same number of passengers was carried by the Air Lines this week as last week. This is 366 against 171 last year, 183 in 1921 and 46 in 1920.

Handley Page have been keeping up a double daily service each way with two machines. One gathers that the Air Ministry will double Handley Page Transport's allowance of 600 subsidised flights and allow them 1,200 thus increasing their total subsidy form £15,000 to £30,000. This course has been advocated in THE AEROPLANE for some time.

Handley Page Transport lead easily in the number of passengers carried, 150 against the Air Union's 79. The Air Union however carried 17,723 lbs. of freight to Handley Page's 3,819. The latter were so full up with passengers that they now have to turn over most of their goods to the Air Union.

Mr. Hamilton-Youell has now joined the Daimler Airway as a pilot and last week made two trips to Amsterdam. He handles the D.H.34 extremely well already.

On Saturday Mr. Donald Robins on D.H.34 G-EBBR (Napier engine) belonging to the Instone Air Line left Cologne with seven passengers at 10.10 hrs. and arrived at Croydon at 12.57 hrs. This time of two hours 47 minutes is a record for the route.

Mr. Hayden is now flying again for the Surrey Flying Services. It will be remembered that when this firm first began operations, Mr. Hayden was pilot for a machine they ran at Castle Bromwich. Mr. Muir tells one that the firm wants two more pilots at once.

On Thursday Air Commodore C. R. Samson, D.S.O., A.F.C., R.A.F., was flying one of the Royal Aero Club Avros. Though his movements in the air seemed rather abrupt and in a pupil or anyone of less eminence might be called brusque he made a very pretty landing indeed.—G. D.

Manchester.

The Manchester Aviation Company opened their season at the Chorlton-cum-Hardy Aerodrome on Sunday. The first week is being devoted to a gala in aid of the local hospitals The weather was very cold and terribly bumpy. However crowds came along and proceedings opened with a "formation of City Councillors." Mr. V. N. Dickinson took the Mayor, Mr. Newnham took an ordinary Councillor and Mr. Elwell took Sir Robert Peacock. Mr. Elwell lost his prop and "force-landed" sliding his undercarriage under his tail without hurting himself or his august passenger. The formation was led by Mr. Bennett-Baggs who took part in the R.A.F. Pageant last year.

When the formation flight was over Mr. Dickinson and Mr. Elwell did about three hours joy-riding each and again on Monday they each put in a further three hours.

Messrs. Green and Mansell of A.I.D. fame are at Manchester looking after the Air Ministry's side of the affair.

The Hospital fund has benefited very considerably already in spite of the cold weather. The fund gave a lunch on Sunday to celebrate the affair, to which they generously did *not* invite the pilots to whom of course they are chiefly indebted for the success of the undertaking. One gathers that the pilots got on all right by giving a lunch to themselves.

Mr. Hope of the De Havilland Aircraft Company is at the aerodrome waiting for suitable weather for photography.

Meanwhile a C.A.T.O. has now arrived at the aerodrome which is prettily decorated with black and white flags!

Vigorous Vickers Veterans.

A football match was played on Apr. 14 between teams of "veterans" drawn from the Vickers Brooklands works and the Aviation Department, Knightsbridge, at Weybridge. The local team won by four goals to one, and after the match the teams and some of the heads of departments sat down to dinner, followed by a concert. Among those present were Capt. O. Vickers, Mr. Sadler (General Manager), Mr. Maxwell-Muller (Superintendent, Brooklands Works), and Capt. F. C. Broome and Capt. S. Cockerell (test pilots).

Of the Schooner Spool.

One learns that there is no truth in the rumour that a member of Major Jack Savage's Sky-Writing Squadron being filled with a desire to rival the late Freiherr Von Richthofen's excellent book "The Red Air Fighter" has written or is about to write a book entitled "The Fed Air Writer," as the result of trying to teach sky-writing in France.

Tons Under a Bushel.

The following grievance deserves ventilation:—

"Sir,—We are frankly disappointed in you.

"You write a brilliant leader on the Aircraft Trade and in the section which you describe as 'Goods Traffic,' you can only forecast the carrying of some Ladies' Frocks.

"You are apparently unaware that this Company has for a year past been sending a daily load of British newspapers to Paris which now amounts to a ton a day The service was kept up throughout the winter months with surprising regularity.

"The *Daily Telegraph* and the *Morning Post* alone have stood by us in good weather and in bad, but THE AEROPLANE has apparently just forgotten our costly and pioneer effort to help the Industry which you represent.

"(Signed) WM. DAWSON & SONS, LIMITED."

[Unfortunately newspapers are not shown as a separate item in official figures and as neither Wm. Dawson & Sons, Ltd., nor the line which carries their papers has seen fit to volunteer any information about their aerovehicular activities one can only plead ignorance of their doings as an excuse for this omission.—Ed.].

THE COUPE COMMODORE LOUIS D. BEAUMONT.

The Aero Club of France issued on Apr. 20 a communiqué of which the following is a careful translation:—

"M. the Commodore American Louis D. Beaumont of New York and of Paris has founded an international proof of quickness doted with 200,000 francs of which the organisation has been confided to the Aero Club of France. This sum is reparted in two objects of art of 25,000 francs each one, and two premiums of 75,000 francs.

"The first proof will have place the 14 October at Istres on the distance of 300 kilometres, to cover on a circuit of 50 kilometres of development. The gainer will receive the premier premium of 75,000 francs if his hourly quickness is at least equal to 290 kms. The second premium of 75,000 francs will run itself the year which will follow the attribution of the premier premium.

"The two objects of art of 25,000 francs each one will be attributed the one to the constructor the other to the pilot who in the two competitions will have realised the most great quickness.

"The engagements presented by the National Federations ought to arrive at 35 Rue Francois Ier., Paris, before the 15 August 18 hours. All resignments concerning this proof will be given at the Commission of Aviation of the Aero Club of France."

It is of interest to note that "M. le Commodore Louis D. Beaumont" came originally from Kansas City, U.S.A., where under his earlier name of Schönberg he commanded a fleet of stores (Anglicé, retail shops). Schönberg of course translates into "Beautiful Mountain" or "Beaumont" according to domicile.

One must confess ignorance as to the particular fleet in which he held the rank of Commodore but one gathers that it was not the U.S. Navy. However it is a good sporting effort on his part to put up a prize for a race to replace the Gordon Bennett Cup and the Deutsch Cup, which have been won outright by France. And in any case he did not outbid a prize offered by some more illustrious person and relegate the older prize to "a second" place as has been done in this country. So one wishes him well.

The pity is that the race should be held at Istres which is a desert area outside Marseilles less accessible from Marseilles than Etampes is from Paris and necessitating a 20-hour journey from Paris to get to Marseilles in the first place. It seems therefore improbable that any British firm will go to the trouble and expense of competing for the Cup of the Commodore American.

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MAY 2. 1923.

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ON THE AIRCRAFT TRADE AND AIR POLICY.—IV.

Some Digestible Figures.

As Colonel Searle has raised the question of available traffic it seems well that some figures should follow his remarks. A well-known aircraft constructor who desires to take no personal part in this controversy has kindly sent the following notes :—

"Examination of the statistics for the London-Paris Service given on page 13, section 26 of the Report, indicate the following interesting facts :—

"On the assumption that the results of passengers ascertained for the period Oct. 1, 1922, to Dec. 31, 1922, are repeated in the period Jan. 1, 1923, to Mar. 31, 1923, and that the results for October and November, 1922, are repeated both for the periods December, 1922, and January, 1923, and again for February and March, 1923, we arrive at the following figures of total traffics British and French :—

"12 months ending Mar. 31, 1922 : Number of passengers carried, 10,335; lbs. of goods carried, 262,631.

"12 months ending Mar. 31, 1923 : Number of passengers carried, 10,315; lbs. of goods carried, 912,301.

"Therefore it will be seen that whereas the number of passengers is virtually constant between the two years, the number of goods increased in ratio from 100 to 288.

"As regards the distribution of passengers between English and French machines, in the first year the British carried 5,798, and the French 4,527, or a ratio of French to British of 1.32. In the second year British machines carried 7,712 passengers, as against 2,603 carried by the French, the ratio being 2.96

"As regards the goods, in the first year the British carried 56,011 and the French 206,621 lbs., from which it will be seen that in the first year the ratio of British goods carried to French ditto was as 25.8 : 100, whereas in the second year the goods carried in British machines amounted to 420,711 lbs. and in French machines 491,580 lbs. or a ratio of British to French of 85.7 to 100.

"It will further be observed that whereas the passengers carried in British machines showed an increase in the second year over the first of 33 per cent., there was a decline in the ratio of the number of passengers carried in French machines of 100 to 57.3; but in the case of the machines of both Nations there was a marked increase of goods carried, the British increase being 750 per cent. and the French increase 238 per cent."

Constructive Objections.

After considering these figures it will be a good thing to look at certain objections to the Hambling Report. These have been raised by one who possesses a markedly critical and analytical brain It will be seen that though they are objections to the proposed scheme they are constructive objections in that they suggest difficulties which must be overcome before the scheme can succeed and they raise for consideration points about which it is worth while to think somewhat furiously :—

"(1) I very much doubt whether the composition of the Committee is of such a nature as to qualify them accurately to weigh up the evidence submitted or to make a report and recommendations of such a far-reaching nature.

"(2) It is amazing that when the Committee sat and asked witnesses to appear before them the terms of reference were never disclosed to the witnesses who were completely in the dark as to what they were talking about. Incidentally one or two most important witnesses acknowledge that they did not attribute much importance to this Committee and indeed answered some of what we can now see were very important questions in almost jocular manner.

"(3) There seems to be considerable mystery as to what witnesses were examined; nobody seems to have knowledge of more than three, whereas the number of people holding positions of responsibility in the aeronautical industry who are vitally affected by these questions is at least twenty.

"(4) The present subsidy scheme is unsatisfactory because it gives the Companies a lump sum for so many journeys. The old system of so much per passenger was in my opinion far preferable because it made the Companies strain every nerve to increase the traffic. Unless the £1,000,000 subsidy is paid in an ingenious manner the whole object of the scheme will be defeated.

"(5) I challenge most strongly para. 33 on p. 14 of the White Paper. I know no single person who believes that an aerial transport company can only be self-supporting by the development of new and longer routes, and I do not believe that 'nearly all the witnesses' said any such thing. In my opinion if the public were completely confident as to the safety of these cross-Channel routes an enormous number of passengers would be carried, as the ease and convenience of the journey and the saving of time is a most important asset in favour of aerial transport. Further, the ground organisation necessary for routes of this character is far less costly per passenger than would be that of a longer journey. Further, what is it proposed to carry on the new and longer routes? Three hours in the air is about as much as the ordinary member of the public can be expected to stand and London to Cologne non-stop in three to three-and-a-half hours is as much as I personally should care to take on. There may be people who would like to step in another machine and do another 3½ hours towards Russia, but I very much doubt whether the number of passengers forthcoming would keep the ground staff in cigarettes. If the Government wish to run a sack of mails regularly from London to India why don't they candidly say so instead of camouflaging their wishes in this manner?

"(6) I strongly disagree from the last part of para. 36 where they say they do not think it necessary to ensure competition. If there is one thing that is badly in need of competition it is aerial transport where the technical development and operating methods are in a very immature state. Unless progress is assured by competition bringing in as many brains as possible commercial aviation will be put back many years.

"(7) The Committee consider that large sums must be expended on operational research, but in my opinion all the money that is being spent has been to this end. They seem to make a point that the present companies are not large enough to deal adequately with this aspect of the subject. But the present companies could be materially improved if they were assured of a ten years' subsidy on a generous scale.

"(8) If the new company is formed entirely independently of the existing companies it would appear that the very valuable experience gained by the latter is to be more or less wasted. Which would be a pity as their four years' labours have given them a very valuable insight into the manifold problems involved and any re-learning of these problems may involve considerable expense and damage to confidence.

"(9) I strongly disagree from the continued use of the words 'National Company.' The three present companies are national companies, i.e. a company formed with the money of nationals. What it really means is the formation of a monopoly and it is just the rankest humbug to attempt to camouflage it as is done in the announcements to the Press, etc., etc. Personally I think that monopolies on the whole are to be very much avoided.

"(10) I believe that there would be the greatest difficulty in forming a combine of the existing companies which have been so long accustomed to compete against one another, because it would be only natural that they should still compete internally. At the same time it must not be forgotten that these people came into the business at a very critical time and have all done very well. Whatever is done therefore should in no way inflict unfair hardship on the present interests.

"(11) My own personal opinion in the whole matter is that it is a move on the part of the military authorities to create a military wing with Government designed machines to be more under their own control. We know that the Air Ministry are preparing the designs of so-called commercial machines. We know that there are those who consider that all subsidised commercial aeroplanes must be made in such a form that they can be converted at two minutes' notice into modern war machines. And we think the Government

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have become increasingly anxious as a result of the growing tension between this country and France, bearing in mind the enormous superiority of the French military air fleets over our own, at least in point of numbers. If my surmise is correct then I think the military policy is most grievously mistaken.

"(12) What we want first of all is to establish a profession of aeronautical engineers and to bring new technical men into the business. You are not going to establish a profession of aeronautical engineers on the basis of orders for military machines any more than you are going to make a profession of electrical engineering or keep the Institution of Electrical Engineers in being on orders placed by the Admiralty for electrical machinery, although the annual value of such orders is enormously in excess of the value of the orders placed by the Air Ministry for aircraft. The Army do not appear to realise that the aircraft of to-day are grievously inefficient and are capable of enormous improvement on fundamental points and unless a big professional industry is created in this country we shall no more be able to provide war aircraft than we should be able to build the British Navy without the vast shipbuilding organisation of this country which exists primarily for mercantile purposes."

The views of the foregoing writer on the composition and procedure of the Hambling Committee are at any rate very interesting and one has so much respect for his general knowledge as to believe that he has a sound basis of fact for his opinions. As to the proposed arrangement of the subsidy and the general questions of passenger traffic and competition one is cordially in agreement with him. Also one agrees that the existing air-lines should be adequately rewarded for what they have done if by bad chance they are forced to shut down.

But one disagrees from him in his idea that the Air Ministry or rather the Air Staff of the R.A.F. have any belief in the use of commercial aeroplanes in time of war except remotely as auxiliaries to an extent even less than that to which merchant ships were useful for fighting purposes at sea in the War 1914-18. If there is one Government Department which more than any other has a thoroughly sound view of the comparatively slight value to the R.A.F. of Civil Aviation for many years to come it is that of the Air Staff.

Also one disagrees from him on the matter of creating a profession of aeronautical engineers. One believes that a few millions spent on big orders for the R.A.F. for war machines which must compete in speed, durability, strength and manœuvrability with those of other nations would produce more and better aeronautical engineers in our aircraft factories than would the same millions spent either on air-line subsidies or on basic research. In the former case most of it would go on running expenses (as air-lines use up so few machines—*vide* Colonel Searle) and in the latter research experts seldom know anything about constructional engineering. What the Admiralty does or what the Army realises matters little so long as the Air Staff of the R.A.F. is determined that our aviators shall have the best aeroplanes and engines in the World. And that is happily our position to-day.

The Monopoly Question.

Another candid and wholesome criticism with which one is in entire agreement comes from a man who knows as much as anybody about running a successful company and about long-distance transport. He writes :—

"If a genuine Company is started, in which both the Government and shareholders have an interest, presumably the Board would consist of partly Government officials and partly representatives of shareholders. Those who were watching the shareholders' interests would only be interested in one thing, namely making the Company pay. Those who were watching the Government's interests would be only interested in one thing, namely seeing that the Government got their money back.

"To make the Company pay and to see that the Government is financially looked after would inevitably end in the Company buying machines from the Disposal Company as far as possible. And what they could not obtain from the Disposal Company they would obtain from one manufacturer of 'planes and one manufacturer of engines, all the others being left out in the cold to go out of business. It could not possibly, from the shareholders' point of view, be a good scheme for a Company to run a dozen different makes of machines and keep a dozen different kinds of spare parts.

"Under the circumstances one can only imagine that the worst thing that could happen for the manufacturer would be for such a Company to be started. I cannot conceive that a Company could be run in which the shareholders would be so little considered as to allow the Board to order a number of machines from a number of different makers, and one would imagine that the interests of the Government and the interests of the shareholders would continually clash.

"If only one 'plane and one engine were used the other manufacturers would have no money and no incentive to experimental and development work. It would therefore lead to the wholesale sacking of thousands of men who are now employed in making aircraft in three different factories. Such an arrangement would be exceedingly bad for the country in more ways than one, but especially if all these aircraft manufacturers went out of business except one, as there would be no manufacturers for the country to fall back on in case of war.

"The Government will do well to see that this scheme is not really being suggested and carried out by some financiers whose only object is to get the money into their hands and have no real interest in the country's welfare."

Here we have again that ingrained distrust of Government benevolence which is generally expressed in the old tag "*Time Danaos et dona ferentes*," or in the story of the Jew who on being offered a cigar by a friend took it and said "Tanks Ikey. Vot's der matter vid it?" There is much to be said for the point of view.

The Founder of Civil Aviation.

If there is one man more than another who has a right to be called the Founder of Civil Aviation it is Mr. G. Holt Thomas. Before the War 1914-18 Mr. Holt Thomas had the energy and foresight to found the Aircraft Manufacturing Co. Ltd., the first aircraft firm in this country to be formed as a manufacturing rather than as an experimental concern. Also he engaged Mr. Geoffrey de Havilland as chief designer, and it is a fact that more aeroplanes of de Havilland design were used during the War than of any other design in the World,—in fact probably more than of any one nation's designs all put together. And to-day there are certainly more D.Hs. in use for Civil Aviation than there are for any other design.

After the War Mr. Holt Thomas founded Air Transport and Travel Ltd., the first big air transport firm in the World. And he also formed the International Air Traffic Association, which to-day binds together the civil aviation of all the Teutonic nations. Obviously therefore the foresight of Mr. Holt Thomas is beyond dispute and his opinion on the new scheme is well worth having, the more so as he disclaims emphatically having had anything to do with any concrete scheme which may have been put forward in connection with the Hambling Report. At the same time one hopes that if and when some satisfactory scheme is produced the promoters of the scheme will have the good sense to induce Mr. Holt Thomas to give it the benefit of his foresight and experience.

Here then are his opinions on the Million Pound Monopoly scheme :—

"The new scheme proposed for Civil Aviation appeals to me as far the best that has been suggested, for several reasons. Firstly, I look on Air Transport as being from an international point of view not more important than the Sea, as has occasionally been said, but as having more far reaching effects, owing to the fact that a ship is generally outside the 3-mile limit, and when touching a port, may be said to touch the fringe of any particular Country. Air Transport is going to fly *right across the territory* of various Nations, and alight presumably in the centre of the country, at their Capital, and other big Cities.

"For this reason the International aspect is a very important one, and while we have the International Air Convention as a means of agreement between the Governments of the various Countries it seems to me that there must be practical National Commercial Companies, or, at any rate, Companies which are the *only* Companies recognised by the various Nations, who will come to a similar working agreement. These Companies form the channel through which the International Air Convention must finally work.

"These views of mine are of course in no way new, as I was responsible for the foundation of the International Air Traffic Association at a Meeting at The Hague years ago.

"Now, if this be agreed, it points at once to a Company or Corporation, such as suggested by Sir Samuel Hoare's Committee.

"Secondly, the arrangement proposes for the first time the security of tenure without which no business man can possibly be expected to embark his capital in, or to even expend his time on, the matter. Nobody will interest himself in anything which at the volition of someone else can suddenly be terminated.

"Thirdly, owing to the very small size of these Islands and the unsuitability of our climate, it seems to me that there are not *very* many opportunities, although there are undoubtedly *some*, for inland flying, and that the importance of British Civil Aviation must rest firstly on Cross-Channel Services and secondly, and what is more important, services farther afield to every part of the great British Empire. We must remember that we are enchained by other countries, and come into our own again when having traversed them we are once again flying over the British Empire.

"This again points, and has always pointed, so far as my

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opinion is concerned, to one big Company conducting these services. The standardisation of flying stock, the avoidance of overlapping in various ways at the British terminus, and various well-known evident facts point always to one great concern being the one which is the most likely to make it pay, the sole aim of subsidies.

"Again, it seems to me that the lines may from day to day require reduction of service on some routes, and equally increase of service on others, owing to the traffic requirements; always of course leaving at least the scheduled time table in full working order. Here again, the one great Corporation with a sufficient supply of air stock and pilots, can readily make the most beneficial arrangements.

"Fourthly, British air services, such as London-Paris, for example, have not yet rendered those services to British and French Trade and Industry for which the successful flying results have led one to hope. By successful results I mean that it is possible, allowing for terminal delays, to get a letter, a packet, an individual, or anything else, from an address in London to an address in Paris, or *vice versa*, in four hours. Nothing but the aeroplane will do this. And I have asserted, and still assert, that with the enormous industrial interests between two such great Cities, there must be hundreds of opportunities of commercially using a service of this description.

"At the same time, for many of these opportunities, which simply await development, the Authorities, such as the Post Office, Customs, etc., will undoubtedly have to give special licences and special facilities, and will have to recognise generally that the aeroplane can do something which no other form of transport in the World can do. Here again the the new proposal seems to me to be one which will meet the case.

"Presumably the proposed Corporation would have the frank confidence of the Government, as nearly every Air Transport Company in every other Country has to-day, and once having persuaded the Government that such and such a permit or right is necessary it will be able to go to the Department in question, backed say, not only by the Air Ministry but even by the Cabinet. It is I think evident that the argument is sound as it would be absolutely impossible for the great Government Departments to give licences to any one, to individuals or smaller Companies.

"Personally I think the scheme is an excellent one from every point of view. It is certainly apparent that £100,000 will not suffice for the first year, but I gather that the million may probably be taken in various ways. At the same time it ought to be, and it is, I think, understood that the subsidy is only paid to help Civil Aviation to establish itself, and if it cannot do so in ten years then I think it will never do so at all.

"In justice to the Operating Companies I think it should be remembered that the real need for a subsidy is the very heavy subsidies paid by other Nations, and it is this that really renders a subsidy necessary.

"Lastly, I may say this, I look on this proposed Company merely as a start. It should lead to very great expansion, and it is only a Company established on such lines which can, in my opinion, properly expand. Everybody knows to-day that it is possible to fly to Australia, say, in ten days. The route in many places would be difficult, and would require considerable expenditure of capital.

"In many parts of the World the actual territory is to a great extent an unknown proposition, and if a future Company should take on its shoulders, as it should do, the responsibility of putting an aerodrome and station in some difficult place from a territorial point of view, it must necessarily be in a particularly frank and confidential position so far as the Government is concerned. It must be in a position to tell the Government clearly that its estimate of expenditure on certain stages of the route has been too little, or even too much.

"It must be out to prove the various uses of air transport, and to show that air transport can be made to pay, and it is only such a Company as has been proposed that can I think raise the capital and carry out these high ideals. Air Transport at 100 miles an hour throughout the Empire, at a ton-mile cost which already is low for such a high speed, *must* be a commercial proposition.

"Telegraphy is the only thing which is faster than the aeroplane for conveying words, but the cost is enormous, and the aeroplane must take its place *between* the speed of telegraphy and telephony (neither of which can convey what the aeroplane can) and ordinary slower means of transport, such as boat and train. It follows that the cost of conveyance must equally be *between* the cost of conveyance say of a shilling a word for a cable and a penny for a letter of thousands of words. Speed *must* be paid for.

"The Company proposed by Sir Herbert Hambling's Committee is I think the means of carrying out these plans."

A Business Man's View.

The first firm to come into the air transport business fro outside the Aircraft Trade were S. Instone and Co. Ltd coal merchants, ship owners, etc., of Cardiff. They ran single D.H.4 for the transport of their own officials an documents between London and Paris as soon as was po missible after the War. From this one machine arose th Instone Air Line Ltd. with its somewhat variegated flee The head of the firm Sir Samuel Instone has been given Knighthood for coming in and staying in where bigge British industrial firms feared to tread

Under the Hambling Scheme it seems quite probable that th Instone Line, along with the Daimler Airway and Handley Pag Transport Ltd., will be compelled either to give up air transpor or else make it a business proposition on its merits withou any subsidy, unless the Instone interests can either form or work in with the Million Pound Monopoly Company Therefore the views of a Director of the Instone Air Line are particularly of interest. Mr. Theodore Instone has ex pressed the firm's opinions thus :—

"I have no doubt that the broad conclusion put forward by the Committee appointed by the Air Minister regarding the one large Company scheme is a right and proper one Both my brothers and myself have advocated this for th last three years, and it has always been stated that no Government or Cabinet would give any one Firm or Com pany a monopoly such as has been suggested by the presen Air Minister's Committee.

"My opinion is that financed in the proper way—not by idealists or city speculators in shares—that such a Company properly supported by the Government must be the one t put Civil Aviation on its feet in Great Britain.

"I know my brother Sir Samuel Instone has a definite scheme to put before the Minister, under which provided certain specific guarantees are given by the Government a large amount of money has been promised in the City t develop Civil Aviation in this country on proper business lines I also know that one of his suggestions was, if possible, t take over the existing companies who have been pioneers and who stood by flying in Great Britain when it was at a very low ebb, besides which they have obtained considerable experience and data.

"Therefore, in my opinion, and briefly, I think that no body of business men can come to any conclusion other than the broad outlines of the Committee.

"I think in the interests of aviaton generally, the management and control of such—what I may call 'national" company should be independent of any aviation or engine-manufacturing firm.

"One of the great advantages of one large company would be that there would be only one set of overhead charges instead of many.

"I also emphatically think that this parent company should have nothing to do with research—this should be a matter entirely for the Air Ministry and its departments well established for that purpose.

"The great attraction to the recommendation in my opinion is, that it has at last been firmly established, no doubt by strong evidence, that some years will elapse before the real commercial, economic aeroplane can be thoroughly proved, and before flying can be undertaken in any weather, including fog, so that a regular scheduled service can be run throughout the year—night and day. It can only therefore be after some years of investigation and research that this ideal machine can be definitely proved, together with the perfection of all the different instruments that are so necessary to combat the many elements including that great enemy of aviation i.e. fog.

"It is therefore necessary for the Government to support Civil Aviation for a few years longer, and give a Company that security of tenure that is so vitally necessary for the future progress and ultimate success, both technically and financially, of Civil Aviation."

An All-Round View.

The next contribution comes from Mr. A. V. Roe, who as the pioneer of British Aviation deserves special attention. There are some who think because the Flying Services adopted the 504K. Avro as the standard training machine throughout the War that Mr. A. V. Roe's mental activity began and ended with the Avro tractor biplane. Never was there a more erroneous idea. The other Avros produced during the War were better than most contemporary machines but somehow the Avro people never had quite the right pull in the right quarters to get them adopted though far worse machines were ordered.

Of late the "Aldershot" and "Bison" have shown that Avro designs are still ahead and are appreciated by the newer Powers at the Air Ministry and this interesting letter will prove equally that Mr. A. V. Roe's individuality is as vivid as ever on subjects outside aircraft design :—

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

A general consideration of the low-powered aeroplane in the light of present developments will be found below.

Incidentally, the annoyance of certain French critics with the comparisons which have been drawn between the performance of Mr. Manning's "Wren" and that of the Dewoitine machine, flown by M. Barbot, may be increased by certain passages therein.

An airscrew-driven "Skimmer," produced in India with the assistance of an old aero-engine and airscrew, is described and illustrated herein.

Some particulars of a very remarkable test performance recently completed by the Bristol "Jupiter" air-cooled engine will be found hereafter.

THE LOW-POWERED AEROPLANE.

By W. H. Sayers.

In France there are already quite a large number of prizes of one kind and another on offer for specific performances by *avionettes* as the French term the motor-cycle engined aeroplane.

In England, thanks to the initiative of His Grace the Duke of Sutherland, there appears to be a certainty of very considerable activity along the same lines, and judging by results already achieved it seems quite probable that, despite a very considerable start in the matter of constructional work on the part of French manufacturers, Britain will not lag seriously behind our late Allies across the Channel.

As a matter of fact Mr. Manning's "Wren" was only a matter of a day or two behind the first French machine of this class to fly, and although it seems probable that during the next month or two there will be quite a number of such machines produced in France, whereas in England it will be at least four or five weeks before the "Wren's" first successor can be ready to take the air, there will probably be some five or six machines nearing completion at once in the space of a couple of months.

Incidentally the "Wren's" performance has stirred up some considerable controversy in France. M. Barbot's Dewoitine machine, which flew a few days before the "Wren's" first test, is a considerably heavier machine and is fitted with an engine of nearly three times the cylinder capacity of the "Wren's" A.B.C. engine.

Hence in some circles the Dewoitine has been compared to some disadvantage with Mr. Manning's design. And in reply a very considerable effort has been made to show that the Dewoitine is really a more efficient machine than the "Wren."

It appears that to qualify for the majority of the prizes available in France an engine of not more than 10 h.p. is permitted. It is not quite certain what rating is adopted, but apparently M. Barbot wishing to test his machine without waiting for the special 10 h.p. engine which is being built by the Salmson Works for the purpose, fitted to the machine a two-cylinder Anzani cycle-car engine of some 1,100 c.c. capacity, nominally of 10 h.p. which should if it be a reasonably well-designed affair develop something like 30 h.p. at 3,000 r.p.m.

However, according to the testimony of M. Louis de Monge in "Les Ailes" of Apr. 19, who designed the airscrew, it was held down to 1,350 r.p.m. on the ground at full throttle by the airscrew, and that at this speed the effective B.H.P. was only 8.25.

At full throttle flying level the airscrew turned at 1,500 r.p.m., equivalent to roughly 10 h.p., and throttled to 1,200 r.p.m. the machine was able to keep its altitude.

From the airscrew characteristics it is deduced that only 4.9 h.p. was required for level flight.

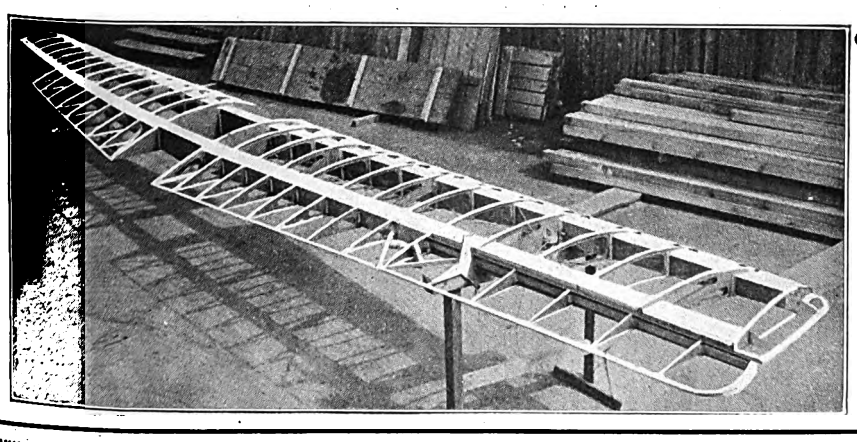
The Dewoitine machine weighs, loaded, 250 kg. or 550 lbs. At cruising power, taken as 5 h.p. therefore it is claimed that the Dewoitine carries 50 kg.—or 110 lbs. per h.p.

The "Wren" fully loaded weighs 360 lbs. It is said that the minimum h.p. of level flight for the "Wren" is 3.5. Hence the "Wren" carries 103 lbs. per h.p. only against the Dewoitine's 110 lbs.

Also the Dewoitine is said to have a higher speed than the "Wren," and the superior qualities of the French design are thus supposed to be vindicated.

The argument is somewhat childish—or perhaps Latin. In the first place the "Wren" is not fitted with a rev. counter and nobody knows what is the minimum power at which it will fly. The engine fitted turns at 2,600 r.p.m. on the ground at full throttle. From the power curve of the engine this appears to be equivalent to 4¾ B.H.P. only—and not to anything like the 7 h.p. allowed as the maximum of the engine. From this it is fairly safe to deduce that the machine will fly level at less than 3½ h.p.

Secondly the fact remains that Mr. Manning has produced an aeroplane which satisfies the British Air Ministry as to strength, which carries a man with an engine of 400 c.c.—1/8 of the Dewoitine cylinder capacity—and which,



LIGHT AEROPLANE CONSTRUCTION.—The wing skeleton of the Udet sporting single-seater built by the Udet Flugzeugbau, München. With a 35 h.p. Haacke engine this machine is well above the power limit for the prizes now on offer in England, but the light and simple construction could easily be adopted for still smaller machines

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fully loaded weighs only ¾ of the weight of the Dewoitine machine. In other words the "Wren" itself—apart from its pilot—weighs only about half as much as the Dewoitine. And as the useful load in each case is a man, the "Wren" carries the same useful load for at the outside 7/10 of the h.p. In other words the "Wren" carries 50 lbs. of useful load per h.p. as against about 33 for the Dewoitine.

The argument as to speed has no merit, for the "Wren" has never been opened up to full speed, and the alleged top speed of 50 m.p.h. is only a safe guess based on very preliminary trials.

As has already been said the argument as a whole is childish. The "Wren" is definitely an attempt to fly with the minimum of power and is fitted with an engine that one can put into a respectable-sized pocket. The Dewoitine is a relatively high-powered aeroplane even if the designer has chosen not to use the power available, and to compare the two designs on a basis of load per h.p. is entirely misleading.

At the same time this comparison does open up anew the question which it was sought to discuss in this paper some month or two ago of the relation between the minimum power machine such as the "Wren," and the low-powered aeroplane properly speaking.

The performance of the "Wren" has admittedly somewhat modified the views previously expressed as to the practical possibilities of this type of machine. The loading of the "Wren" (about 2.5 lbs./sq. ft.) is a little higher than that assumed for the "assisted glider" in the article (Dec. 6) in question. The performance secured all round is distinctly better—probably because of better airscrew efficiency—than was there suggested.

And in fact the "Wren" seems to be a perfectly flyable aeroplane with quite a large reserve of power, and there is very little doubt that this machine would be able to do quite a lot of soaring, and so economise in petrol under favourable conditions. With its very small engine and with some assistance from up-currents such a machine might do an astonishing mileage in the competition for the Duke of Sutherland's prize.

However it might also do very badly in that same competition if the weather conditions are against it. Suppose that the contest is held at Itford, in weather such as obtained at the Gliding meeting last year. The "Wren" should soar along the ridge from Firle to Itford or vice versa without appreciable petrol consumption. But then it has to fly two legs of the triangular course away from the hill, and at best one leg will be flown against the wind and one with it.

Against a 30-m.p.h. wind the "Wren," assuming its top speed to be 50 m.p.h. will use petrol for 50 miles to cover 20 miles. Some of this it will get back returning with the wind, but it will lose heavily in high winds owing to its low speed.

Then there is the question of how such a machine will behave in a really strong wind. It is true that equally lightly-loaded gliders behaved reasonably well in violent gales at Itford, but it is to be remembered that they stuck closely to a fairly uniform hillside in a fairly steady if strong wind. An engine-driven machine pushing its way across normal country into such a wind will encounter considerably more violent bumps than those found on the hill slope at last year's meeting.

And there are grounds for believing that such machines may become practically unflyable in quite normal weather over ordinarily diversified country, simply because the extra resistance set up by fairly vigorous use of the controls is so great a proportion of the normal resistance that the machine will be unable to maintain its height.

A machine with an appreciably heavier loading, considerably more h.p. and a higher normal speed will therefore stand quite a good chance of beating the minimum power type in moderately bad weather.

Obviously it will lose less against a head-wind. Its greater loading will to some extent make it less sensitive to the effect of bumps. And as the more heavily-loaded machine can be made smaller, it can also possibly be made lighter than the minimum power type. As a matter of fact there is a distinct possibility that very little indeed in the way of extra h.p. will be needed to fly level with a carefully designed 4 lb. per sq. ft. machine as compared to the 2½ lb. per sq. ft. type, and that the increase in cruising speed may compensate for the increased power necessary to such an extent that even in a flat calm the more heavily-loaded type will do very nearly the same number of miles per gallon.

The rules drawn up for the Duke of Sutherland's prize limits the engine to a cylinder capacity of 750 c.c. Between this and the A.B.C. engine of the "Wren" there is a range sufficiently wide to give designers scope for wide latitude in the choice of power and wing loading, and it is to be hoped that the machines produced for the competition will cover the maximum possible range in this respect.

It is difficult to avoid the conclusion that for all-round sporting value a small fairly heavily-loaded machine with an engine approaching the limit allowed for the competition will be more satisfactory than the lightly-loaded minimum power type—but it will not necessarily be the best for the purposes of winning the prize.

The weather during the contest will have a very important bearing on the result—but the competition cannot fail to supply a good deal of very interesting data on quite a number of points.

AN INDIAN AERO-SKIMMER.

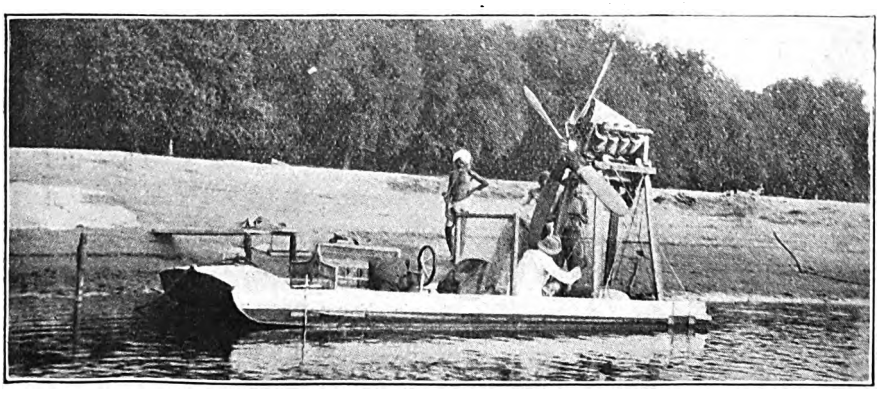
Aircraft experience and material has come in very useful in the production of a hydro-glisseur recently produced at Lahore by Flight-Lieut. O. G. W. G. Lywood, R.A.F., and Messrs. B. F. Akroyd and Mr. H. Howard of the Standard Oil Company. As may be seen from the accompanying photographs the boat is more or less of the type made familiar before the war by the Comte de Lambert in France but in fact this particular boat is an entirely original production.

The boat itself was built at Lahore by Sikh carpenters who had certainly never seen anything of the sort before The length overall is 17 feet 6 inches, the beam 7 feet 6 inches, the depth 1 foot 2 inches and the draft at rest 8 inches. At a speed of 25 m.p.h. the draft is only 2 inches.

The hull is a flat-bottomed two-step hydroplane, the plane surfaces being covered with sheet aluminium to give a good skin. The frames are of "chouglan," the side planking of teak and the bottom of deodar. The rudders are fitted forward on each side of the boat and are of special self-lifting design so as to avoid damage if they run into anything in the water, and aft there is a tail-fin to prevent horizontal spinning. This fin is also self-lifting.

The engine is an old 90 h.p. R.A.F. fitted with a tractor airscrew of the type used on the B.E.2c biplane and therefore obviously of incorrect pitch for the purpose for which it is used. As may be seen from the photographs the engine and airscrew complete is mounted on four wooden struts cross-wired according to aeroplane practice. Petrol is fed by air-pressure from a 25-gallon tank under the engine.

The full speed of the craft unloaded is about 40 m.p.h. and her cruising speed with six up is 25 m.p.h. with a petrol consumption of 6 miles to the gallon. The boat was built early in 1922 and proved a most valuable acquisition during the hot



The Air-driven Skimmer recently built at Lahore by Messrs. Lywood, Akroyd, & Howard. The engine is a 90 h.p. R.A.F. driving the customary four-bladed B.E.2c airscrew

This type of craft, with its shallow draft and high speed has obvious commercial uses on the rivers of the less civilised parts of the globe, and in tropical climates its automatic cooling effects must serve as a distinct tonic to European passengers.

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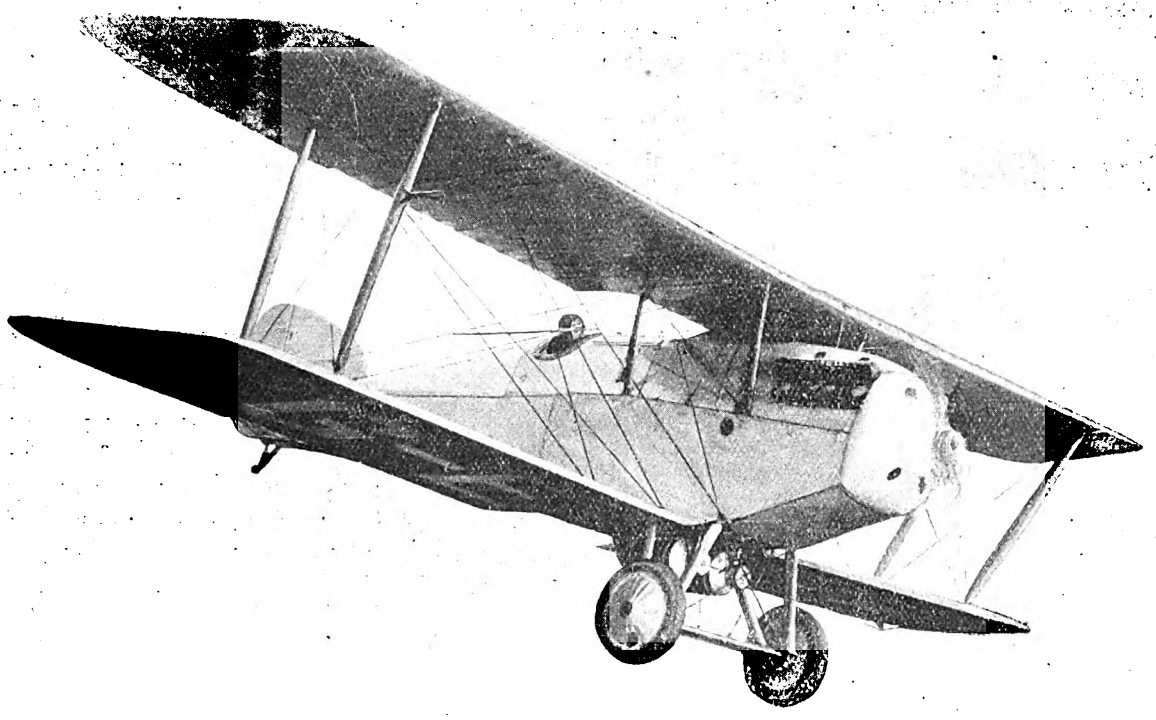
An A.D.C. Martinsyde F4.



Fitted with 300 h.p. Hispano-Suiza and Lamblin radiators.

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weather. The sender of the information says that there is nothing to touch a twenty-mile run up stream at 25 to 30 miles per hour in the evening after existing in a temperature of about 118 degrees all day.

During the year many interesting experiments were made with rudders and fin areas and angles of incidence. This particular craft has proved that the type is most useful for Indian rivers as the extremely low draft allows it to go almost anywhere where it is wet and the high speed overcomes the rapid currents which exist during the Monsoon period. In fact so satisfactory has it proved that the chief engineer of the Construction Branch of the Irrigation Department has bought this particular boat.

It was found at first that non-aviation people took a lot of persuading that an aero-engine could keep going for more than five minutes without giving trouble, but the old 90 R.A.F. has now converted them. It was installed in May 1922 and barring cleaning the plugs twice it was not touched at all until January 1923. During the intervening period it was run by various members of the local boat club without any previous experience of aero engines and it has never failed to start up at the first or second pull over of the screw.

In January the boat was taken over by the Punjab Waterways Department and one of the engineers without any previous experience of the type of craft took her out in a gale of wind and did a right angle skid at 40 m.p.h. with the result that the boat turned completely over. Mr. Dewar of Vickers Limited and a lady passenger were thrown into the water but fortunately only got a wetting. The boat sank in twelve feet of water and next day was salved by one of the original owners diving down and fixing a rope to the engine by means of which she was fished up, even the airscrew being undamaged after being submerged for 28 hours. After that the engine, magnetos, etc., were dismantled and cleaned and in February the boat was running again as well as ever.

His Excellency the Lieut.-Governor of the Punjab had a trip in the boat in March and was duly impressed. She is now going to the Sutlej Valley Irrigation Scheme for inspection work. The original proprietors are now building a similar but improved boat for this year's hot weather and are installing a 240 h.p. Siddeley "Puma" engine with the intention of fitting to it a compressed-air starter and a pusher screw instead of a tractor.

THE BRISTOL "JUPITER'S" NEW RECORD.

A record performance for an aero engine of its weight and type has been completed by the now famous 400 h.p. Bristol "Jupiter" engine. Under official A.I.D. supervision, the engine was run for 150 hours and included in this was one non-stop period of 50 hours. As this engine is being mainly fitted to fast types of military aircraft this may be taken as representing a non-stop flight from Southampton to Capetown.

The tests were undertaken to demonstrate to the world the unique reliability of the "Jupiter" engine. The engine submitted was a standard Mark IIIA type. After completing the usual Air Ministry endurance test and power-curve on the dynamometer, the engine was stripped down, examined, and all parts measured. The engine was then erected and run for 150 hours, absorbing 342 h.p. at 1,575 r.p.m.

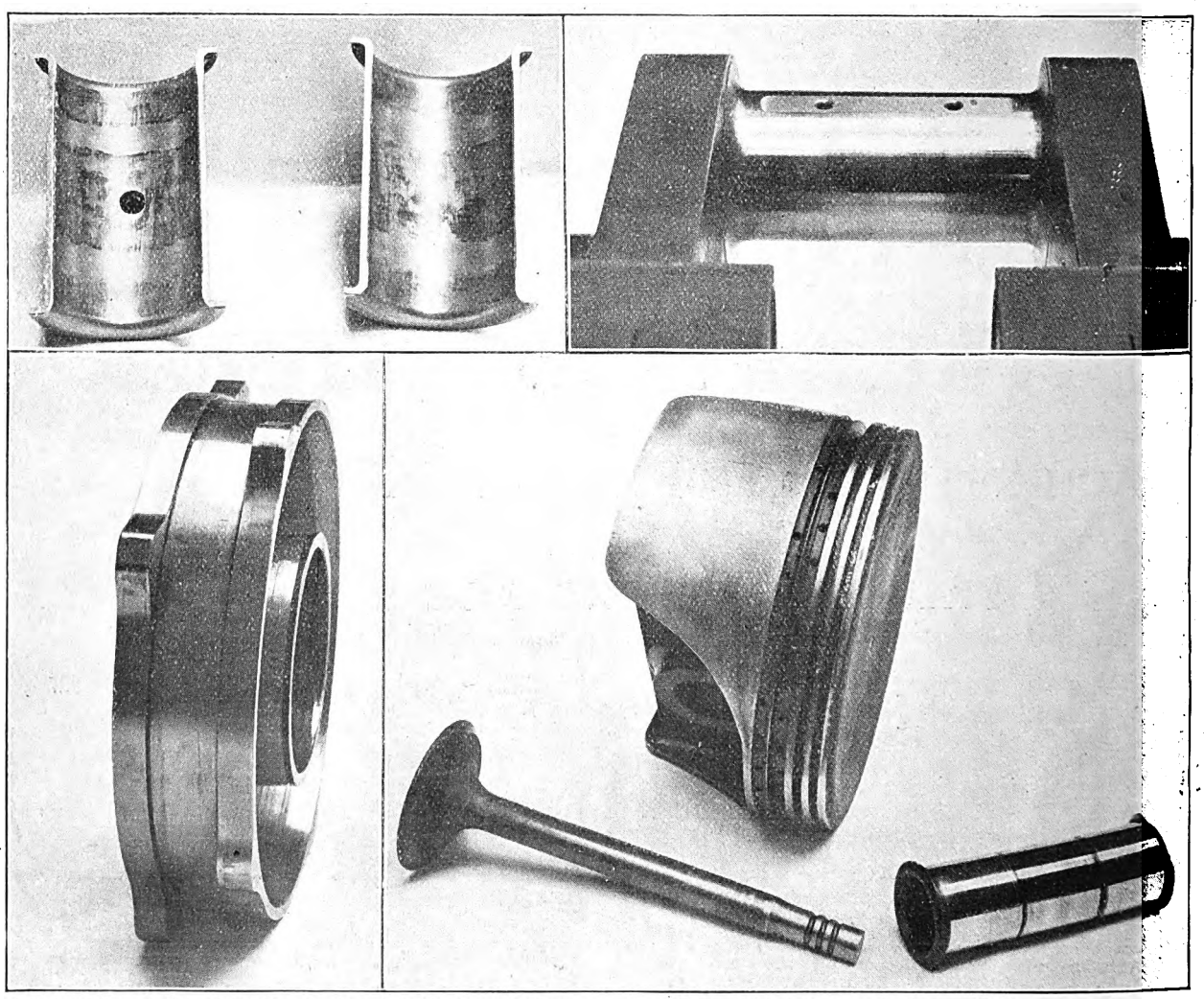
The cooling was by means of the slipstream from the propeller driven by the engine.

Throughout the test an exhaust ring and long tail pipes were used, which in itself we believe to be a record for any endurance test for an aero engine.

The total amount of petrol used on the test of 150 hrs. 55 mins. was 3,969 galls., or 26.25 galls. per hour (.614 pints/BHP/hr).

The total amount of oil used was :—1,776 pints or 11.75 pints per hour (.0344 pints/BHP/hr).

At the conclusion of the test the engine was stripped and



Components of the "Jupiter" after its 150-hour full-power run. Top, left, big-end bushes, right, crank-pin. Below left, the cam ring, and right, valve, piston and gudgeon-pin. These parts were photographed untouched after dismantling the engine, and the photographs indicate the excellent general state of the engine.

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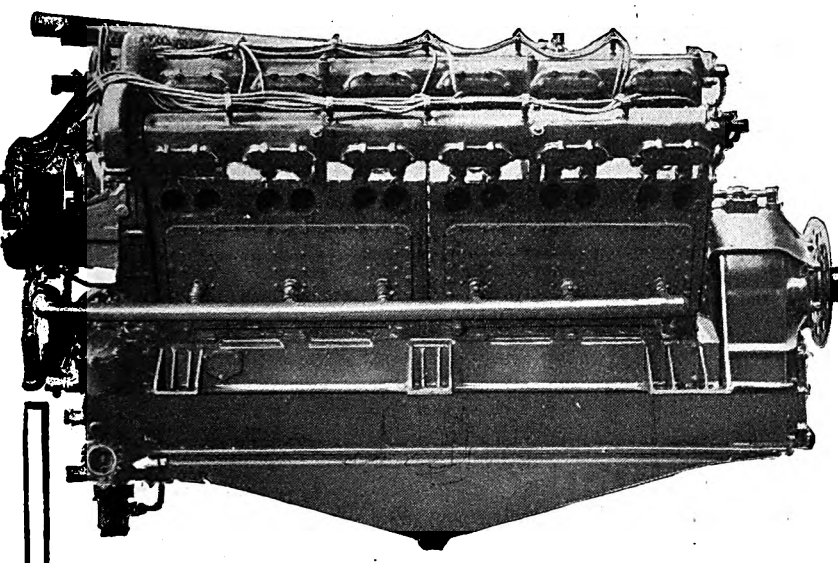

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"MATABELE"
400 h.p. 12 cylinder
AERO ENGINE
As supplied to the French Government.

The following list of Engines, designed and manufactured by the Company, is unequalled in its range. All these engines are of proved efficiency and extreme reliability, and can be recommended with confidence for aviation purposes of all kinds.

"DYAK"	100 h.p. 6-cylinder	"SIKH"	1000 h.p. 12-cylinder
"ARAB 2" (Direct Drive)	200 h.p. 8-cylinder	"MAORI"	275 h.p. 12-cylinder
"MANITOU" ..	300 h.p. 12-cylinder	"COSSACK" ..	350 h.p. 12-cylinder
"MATABELE" ..	400 h.p. 12-cylinder	"SIKH"	500 h.p. 6-cylinder

We shall be pleased to supply specifications, installation diagrams, prices, and any other information upon request.

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. . . *Northern Service & Repair Works*, 288/294, Eccles New Rd., Weaste.

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all parts carefully examined. The maximum wear on the major parts of the engine in no case exceeded .0005 of an inch.

Untouched photographs taken of the main components of the engine show that such parts as the big end bearing, valves, pistons, crankpin, cam sleeve, tappets, etc., are in perfect condition, and show no wear whatsoever.

In the past it has been realised that the static air-cooled radial engine offered great opportunities for saving of weight, but continual failures had led one to be somewhat sceptical of the life of such parts as valves, pistons, big end bearings, etc., on such engines, and whereas the lightness and compactness of the static air-cooled radial engine were appreciated, they were relegated to the same category as rotaries.

The official test of the 400 h.p. Bristol "Jupiter" once and for all dissipates these views, and enables the static air-cooled radial engine to be placed in a category of reliability, performance and life, equal to any other aero engine in existence of whatever type.

THE WORLD'S RECORDS AS THEY STAND TO-DAY.

The following list of records gives an excellent idea of the American effort to capture the World's records, and with the exception of the height record all these have been made within the last six months. All have been made by military pilots on military aircraft from military fields with official assistance.

Duration: Lieuts. Macready and Kelly on Fokker T2. 36 hrs. 5 min. 20 secs. 17.4.23.

Distance: Lieuts. Macready and Kelly on Fokker T2. 4,090 kms. (2,541.2 miles). 17.4.23.

Altitude: Lieut. Macready on Lepère biplane. 10,518 m. 28.9.21.

Speed, 1 km.: Lieut. Maitland on Curtiss Army racer. 386 km.p.h. 29.3.23.

Speed, 100 kms.: Lieut. Maughan on Curtiss Army racer. 18 min. 6 secs. 9.10.22.

Speed, 200 kms.: Lieut. Maughan on Curtiss Army racer. 36 min. 12 1-5 secs. 9.10.22.

Speed, 500 kms.: Lieut. Pearson on Verville-Sperry monoplane. 1 hr. 50 min. 12 secs. 31.3.23.

Speed, 1,000 kms.: Lieut. Harris on D.H.4 4 hrs. 42 min 35 secs 31.3.23.

Speed, 1,500 kms.: Lieut. Harris on D.H.4. 8 hrs. 9 secs. 17.4.23.

Speed, 2,000 kms.: Lieut. Harris on D.H.4. 10 hrs. 53 min. 17.4.23.

Speed, 2,500 kms.: Lieuts. Macready and Kelly on Fokker T.2. 21 hrs. 37 min. 3 secs. 17.4.23.

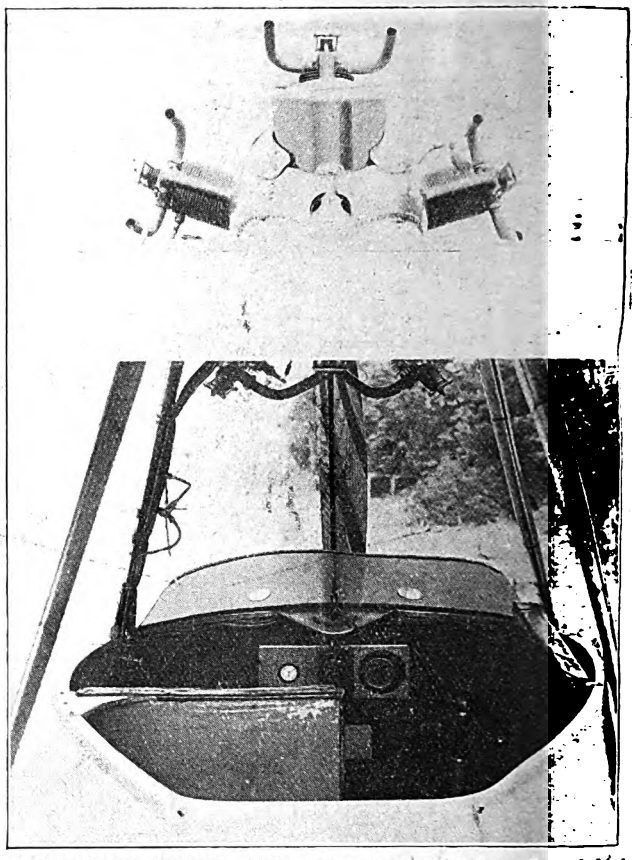
Speed, 3,000 kms.: Lieuts. Macready and Kelly on Fokker T.2. 26 hrs. 1 min. 32 secs. 17.4.23.

Speed, 3,500 kms.: Lieuts. Macready and Kelly on Fokker T.2. 30 hrs. 28 min. 51 2-5 secs. 17.4.23.

Speed, 4,000 kms.: Lieuts. Macready and Kelly on Fokker T.2. 35 hrs. 6 min. 38 2-5 secs. 17.4.23.

In addition to the above it must be remembered that on Aug. 16, 1921, Lieut. D. McCulloch on a Loening air yacht reached a height of 17,550 ft. carrying 3 passengers, and on Apr. 17, 1923, Lieut. Irvine flying on a Davis-Douglas torpedo-carrier reached a height of 11,300 feet carrying a dead load of 2,422 lbs.

Truly a massive collection of good performances and a graphic illustration of what official encouragement can do for a country, its aircraft trade and its prestige abroad.



A CURIOUS VIEW.—This photograph is taken from behind the wing of the Dornier "Libelle" two-seater flying-boat. It shows the cockpit, the centre section with its struts, and the rear of the 55 h.p. Siemens Halske radial engine.

MORE LOW-POWER PRIZES.

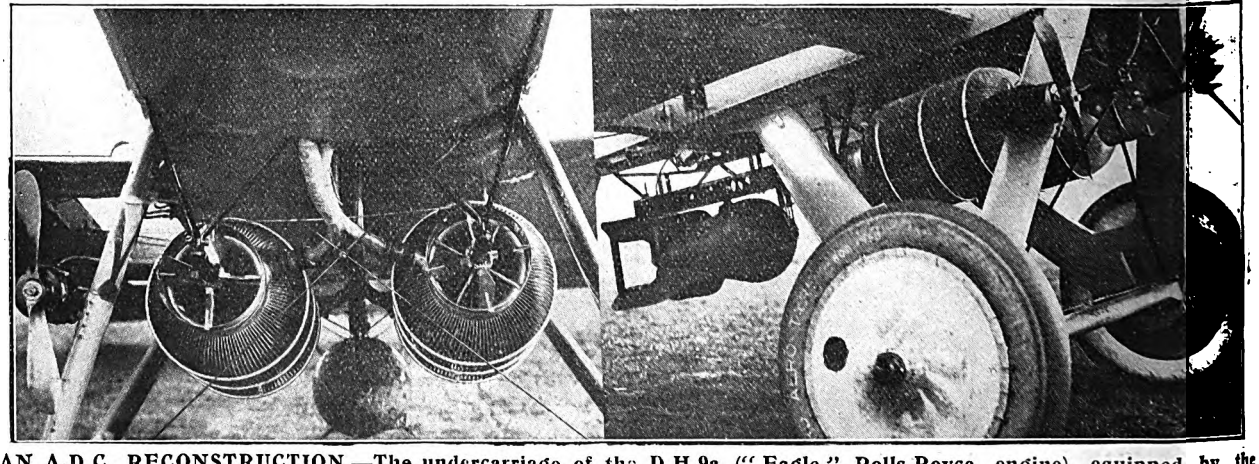
It is announced that a further prize of £500 is to be offered for the highest speed attained round a given course by a 750 c.c.-engined aeroplane during the competition at which the chief feature is to be the contest for the Duke of Sutherland's prize.

Still further prizes are persistently rumoured.

BROADCASTING LICENSES.

Major-General Sir F. H. Sykes, M.P., has been appointed Chairman of the Committee formed to inquire into the question of broadcasting generally and the issue of licences. Possibly a decision may be made therefore any time before the period when it is unnecessary to have any apparatus other than the human organs to receive or transmit wireless messages, always providing that the members of the Committee come of long-living families.

After all it is the duty of a Committee to commit itself to something.



AN A.D.C. RECONSTRUCTION.—The undercarriage of the D.H.9a ("Eagle" Rolls-Royce engine) equipped by the Aircraft Disposal Co. Ltd. for the recent Madrid Competition. The photograph shows the disposition of the Lamblin radiators, the wireless generator, and the bomb-gear fitted in place. Fitting Lamblin Radiators has put the speed up about 15 miles per hour.

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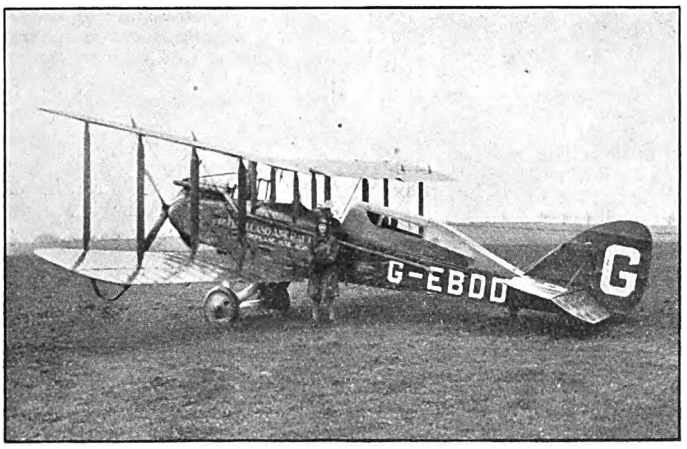
DE HAVILLAND AEROPLANES.



The D.H.9c.—Using machines of this type exclusively, The DE HAVILLAND AEROPLANE HIRE SERVICE has already completed over a quarter of a million miles, running at a fare to the hirer of 2/- per mile.

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Originators of the first Amphibian FLYING BOAT SCOUT in 1921.—This type of machine won the Schneider Cup, establishing world's records in 1922—163 M.P.H.

We produced the first English Commercial FLYING BOAT—1919.
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We established the first International Commercial FLYING BOAT service—England to France, 1919.
We hold the first commercial Flying Boat Certificate of Airworthiness issued by H.M. Air Ministry.
We were awarded the second prize of £4,000 in the Air Ministry's Competition for AMPHIBIANS, 1920, which was increased to £8,000 in recognition of the general excellence of design and construction of the Supermarine Amphibian Flying Boat. This was the only machine to accomplish all the tests and that had no breakages during the trials.
We produced the first specially designed Deck-landing Flying Boat, 1921.
We hold the first official world's records granted by the F.A.I. for Marine Aircraft—duration of 1 hr., 34 mins., 51⅘ secs. Longest distance accomplished 230 miles. Fastest time for 100 kilometres, 62 miles, 28 mins., 41⅘ secs. Fastest time for 200 kilometres: 124 miles, 57 mins., 37⅘ secs.—1922.

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of the International Race for the
SCHNEIDER CUP
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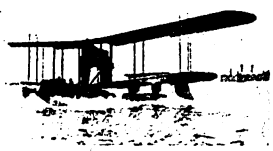
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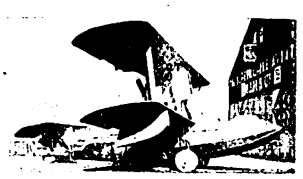
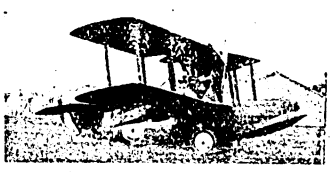
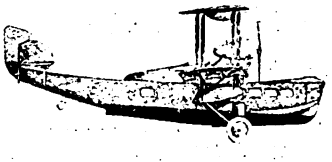

"SEA LION II" SINGLE SEATER AMPHIBIAN.
450 h.p. Napier Lion. Winner of the International Race for the Schneider Cup at Naples, 1922.


"SEAGULL" AMPHIBIAN MACHINE.
450 h.p. Napier Lion.


TWIN-ENGINED COMMERCIAL AMPHIBIAN TO CARRY 12 PASSENGERS AND LUGGAGE WITH CREW OF 2.
Two 360 h.p. Rolls-Royce Eagle IXs.

REGISTERED OFFICES AND WORKS:
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ENGLAND.
FLYING WATER AND SLIPWAY: WOOLSTON.

... advt.

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(Continued from page 320.)

"The new scheme at first sight appears to be an excellent one, but surely any advantages derived from amalgamation and the consequent reduction of staff and overhead charges of the single Company scheme will be more than outweighed by the absence of home competition. It would be a gamble to expect efficient working if we are to rely on the competition from foreign air lines only, consequently I fear in the course of time this inherent fault would become a source of weakness and a hindrance to progress.

"It seems that the better plan would be to encourage the use of aircraft in every conceivable way. Why cannot the airway be made into the cheapest way? We often run trams at a loss but the ratepayers get something for their money.

"If we made the airway the cheapest way there should be a considerable increase in the receipts, for it is the volume of traffic that is really wanted to reduce the cost per passenger carried. The Government could make a grant on the passenger mileage basis which could be reduced as business increased and so arranged as to be profitable, causing keen competition between the existing Companies and any fresh ones which might appear.

"Mails, urgent merchandise, etc., should be conveyed by air without extra charge as much as possible and only extra fees charged in certain cases. The relief thus afforded to existing contractors could be taken into consideration when making fresh mail contracts with them. If the post office waits for existing contracts to run out, how is the airway to get a chance?

"The club, sporting and competition side of aviation should be encouraged, likewise the cheap, simple and safe aeroplane, seaplane and flying boat that can fly well slowly. Flying should be brought within the reach of the many instead of the few as at present. Government aerodromes should be available for the use of club members at certain times.

"Our dear old country is losing all sense of proportion. It has spent over £300,000,000 since the Armistice on unemployment relief. It sends hundreds of millions a year out of the country to rival nations to buy products that can be produced by our millions of unemployed. It spends over four hundred millions a year on drink. It lends fabulous sums to rival nations who only buy a fraction of what we buy from them, instead of from our Empire. We pour millions out on all sorts of problematical schemes abroad and when we discuss an investment that is of vital importance to the nation, a million-pound scheme spread over 10 years is suggested.

"Our national security is dependent on the strength of our industries and I think most people are agreed that the Aircraft Industry is now one of the most essential. A study of our exports and imports for the last thirty years reveals a very deplorable state of affairs and shows clearly the cause of our present unemployment. We have been allowing other nations to do far too much work for us, with the result we are badly in need of home and export trade. It is all bunkum for our statesmen to blame the war. They are to blame.

"Here aviation can come to the rescue to a certain extent, for it is pleasing to note last year we exported nearly £2,000,000 worth of aircraft. This export trade should be encouraged and every inducement given to the British Aircraft Industry to maintain the good name they have already gained for their products. It is quite conceivable that our annual aircraft export trade may be increased to £50,000,000 a year within the near future. So even if we spent £5,000,000 a year to bring this about it would be money well spent, for there is a vast difference between spending money amongst ourselves and sending it to rival nations.

"There are of course other obvious advantages in possessing the World's largest and best Aircraft Industry. We bought, I believe, over £100,000,000 worth of aircraft and other material from the U.S.A. during the latter part of the war, which was not up to our standard and could not be used. The nation would have been saved this huge loss had the British Aircraft Industry received the support it should have done and to-day we find the same old blunders being made.

"It therefore seems that our best policy is vigorously to encourage the use of the air for sport, transport, defence, etc., and I fail to see how bolstering up a single Company will help us materially to achieve in the air the supremacy which is now still within our grasp.

[One hopes next week to publish some lighter if no less valuable contributions to this controversy.—C. G. G.]

R.A.F. INTELLIGENCE.

The Royal Wedding.

On the occasion of the wedding of H.R.H. Group Captain the Duke of York, K.G., on Apr. 26, to the Lady Elizabeth Bowes-Lyon, a Guard of Honour of the R.A.F. under the command of F/Lt. A. Wombwell was mounted at Westminster Abbey.

The Central Band of the R.A.F. under the direction of F/Lt. Amers played in the Green Drawing Room at Buckingham Palace after the Wedding Breakfast.

Among the guests at Westminster Abbey were:—The Secretary of State for Air and Lady Maud Hoare, Air Vice-Marshal and Mrs. A. V. Vyvyan, S/Ldr. and Mrs. Lane.

The Duke of York was married in the uniform of the Royal Air Force, and as he holds a commission in each of the Senior Services this may be taken as further evidence of the standing of the First Line of Defence, for it is known that strong influence was brought to bear to induce him to be married in Naval uniform.

Appointments.

AIR MINISTRY, Week ending May 1.

GENERAL DUTIES BRANCH.—Grp/Capt. A. Fletcher, C.M.G., C.B.E., M.C., to R.A.F. Depot, 18/3 (Non-effective Pool), on transfer to Home Estab.

F/Lts. F. L. Luxmoore, to No. 1 Sqd., Iraq, 26/3; W. A. K. Dalzell, to No. 45 Sqd., Iraq, 30/3; G. A. H Pidcock, to H.Q., Iraq Command, 23/3; F. R. Wynne, M.B.E., to H.Q., Iraq Command, 21/3; C. P. O. Bartlett, D.S.C., to R.A.F. Depot, 13/4; G. T. Richardson, the posting of this officer to the School of Photography, South Farnborough, as previously notified, is hereby cancelled.

G. Bower and H. M. Massey, M.C., to R.A.F Depot, 18/3. (Non-effective Pool); C. B. S. Spackman, D.F.C., and H. B. Pett, M.C., to R.A.F. Depot, 18/3; C. R. Steele, D.F.C., and E. I. Bussel, to R.A.F. Depot, 26/3, on transfer to Home Estab.

T. D. Budgeon, O.B.E., to Record Office, Ruislip, 23/4; J. H. Green, to Air Ministry, 23/4; R. C. Bryant, to H.Q., Iraq Command, 20/4; C. Findlay, D.F.C., to No. 7 Grp. H.Q., Andover, 23/4; P. Harris, to H.M.S. "Pegasus," 23/3, A. J. Rankin, to No. 267 Sqd., Mediterranean, 7/4.

F/Os. G. R. O'Sullivan, to No. 6 Sqd., Iraq, 27/3; H. W. Clayton, to No. 100 Sqd., Spittlegate, 7/5; E. H Oxley-Boyle, to R.A.F. Cadet College, Cranwell, 24/4; W. J. Rivett-Carnac, to S. of T.T. (Men), Manston, 24/4; W. Anderson, to Aircraft Depot, Iraq, 27/3; A. H. Baker, to I.A. Aircraft Depot, Henlow, 21/4; J. W. Bell, D.S.M., to No. 1 S. of T.T. (Boys), Halton, 15/5; R. de H. Hutchinson, to No. 100 Sqd., Spittlegate, 24/4; M. G. Penny, to No. 30 Sqd., Iraq, 16/3; D. H. Geeson, to No. 45 Sqd., Iraq, 17/3.

G. L. Carter, H. J. Young, M.B.E., J. E. H. Littlewood, and C. R. L. Shaw, to R.A.F. Depot, 18/3; C. D. Spiers and F. R. Offord, to R.A.F. Depot, 18/3 (Non-effective Pool); O. D. Freeman, to R.A.F. Depot, 26/3 (Non-effective Pool); W. J. Richards, to R.A.F Depot, 26/3; W. R. F. Glover and S. McD Watson, to R.A.F. Depot, 6/4, on transfer to Home Estab.

R. B. Sutherland, D.F.C., to I.A.A.D., Henlow, 26/4; J. Bowen, to Half-Pay List, 19/4; W. D. Vernon-Knibbs, to S. of Army Co-operation, Old Sarum, 1/5; H. A. Argles, to R.A.F. Base, Gosport, 1/5.

MEDICAL BRANCH.—S/Ldr. (Medical) A. J. Brown, D.S.O., to No. 1 S of T.T. (Boys), Halton, 30/.

F/Lt. (Medical) C. A. Meaden, to R.A.F. Base, Leuchars, 26/4; E. G. S. Hall, M.B., to R.A.F. Base, Calshot, 4/5

STORES AND ACCOUNTANTS BRANCH —S/Ldr. (Stores) W. J. Waddington, O.B.E., to R.A.F Depot, 6/4.

F/Lt. (Stores) W. C. Green, M.C., to R.A.F. Depot, 6/4.

F/Os. (Stores) F. D. D. Gaussen, to R.A.F. Depot, 18/3; C. H. Estab.; V. S. Holbrook, to R A.F. Depot (Non-effective Pool), 1/5; D. Barson, to C. and M. Party, Biggin Hill, 7/5.

F/O. (Accountants) A. C. Pritchard, to No. 84 Sqd., Iraq, 21/3.

STORES AND ACCOUNTANTS BRANCH.—F/Lt. (Stores) F. Paterson, to C. & M. Party, Donibristle, 1/4.

MEDICAL BRANCH.—F/Lt. (Medical) R. S. Topham, M.B., D.P.H., to No. 56 Sqdn., Hawkinge, 13/4.

STORES AND ACCOUNTANTS BRANCH.—F/Lt (Accountant) P. A. Simmons, to R.A.F. Base, Calshot, 18/4

F/Lt. (Stores) L. Smith, to No. 1 F.T.S., Netheravon, 18/4.

F/Os. (Stores) H. N. Stevens, to Aircraft Park, India, 11/4; H. T. H. Copeland, to R.A.F Depot, 23/3.

MEDICAL BRANCH.—F/Lts. (Medical) J G. Skeet, to R.A.F. Depot, 24/4; T. L. P. Harries, M.B., to No. 5 F.T.S., Shotwick, 20/4; J. K. R. Landells, M.B., to R.A.F Hospital, Cranwell, 18/4.

F/Lts. (Dental) J. H. W Fitzgerald, to N. 3 Grp. H.Q., Spittlegate, 4/4.

MEDICAL BRANCH.—F/Lts. (Medical) B F. Haythornthwaite, M.B., B.A., to No. 1 S of T.T. (Boys), Halton, 19/4.

The King has given authority to Grp/Capt. F. V. Holt, C.M.G., D.S.O., R.A.F., to wear the Insignia of the Third Class of the Order of the Striped Tiger, conferred on him by the President of the Republic of China.

The Health of the R.A.F. 1921.

In submitting his report on the health of the R.A.F. in 1921 Air-Cmdre. D. Munro the Director of Medical Services points out that the sickness figures for the total Force show a distinct reduction compared with those of 1920.

Chapter I of the Report deals with the health of the Force as a whole and is introductory to the rest of the report. The death-rate shows an increase from 4.4 per 1,000 in 1920 to 4.7 in 1921, the R38 disaster being responsible for 24 deaths among R.A.F. personnel.

Section V of this chapter shows that there were 114 cases of injury or death from flying accidents as compared with 71 in 1920. Of the 114 cases 69 occurred among officers and there was only one accident among the cadets. A table

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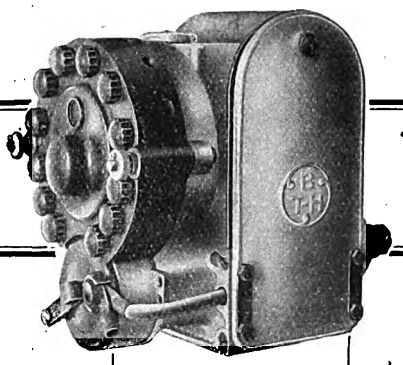

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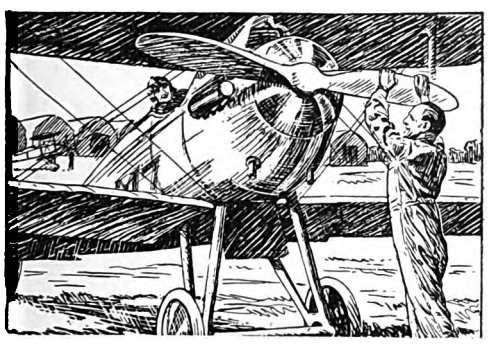

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shows that 2,238 machine hours were flown per fatal accident, 2,100 at home and 2,433 abroad.

A further table shows that among the 1,924 injuries 114 were due to flying, 159 to road transport, 35 to airscrew accidents and 610 to athletics, 431 of these being due to football.

Of the six cases of "wounded in action" five occurred in Ireland and one in Iraq. Two were fatal. Ten airmen were bitten by dogs in 1921 and one by a jelly-fish.

A nosological table of communicable diseases in the R.A.F. abroad shows 122.9 per 1,000 cases of malaria with 0.16 deaths and 122.9 per 1,000 cases of sand-fly fever with no deaths.

The table of comparation rates of injury among different types of units shows 128 cases at airship stations, 132 at experimental units, 121 at flying schools and 136 at squadrons, etc. At Halton the daily average number of sick was reduced to 44.9 from 118.8 in 1920. 711 R.A.F. personnel were invalided out of the Service in 1921.

Chapter III deals principally with the pastimes of the sand-fly and states that 97 cases of sand-fly fever occurred in the Mediterranean, 85 in Egypt and Palestine, 303 in Iraq and 296 in India. The ratio per 1,000 is highest in Iraq, viz., 236.4, but has been reduced, 1920 figures showing a ratio of 742.0. Malaria on the other hand is worse in India the ratio per 1,000 being 337.6. No figures were available for 1920.

During 1921, 82 cases of sunstroke occurred overseas with six deaths. It has been decided to introduce the term "Heat Exhaustion" to cover the mild type of sunstroke.

Chapter IV deals at length with the work of the Central Medical Board, describing the various examinations and tests for both commissioned and other ranks. The number of pilots accepted during the year was 507 and 150 were rejected.

The section of the report which deals with hygiene states that work on accommodation has been practically all reconditioning. Analyses of water supplies have been more frequent and station wells show a considerable variation in purity. The whole report will doubtless be of great interest to the R.A.F. Medical Service.—C. M. McA.

Per Ardua Ad Almam Matrem.

At Corpus Christi College Mr. Edward A. G. Robinson, B.A., Almeric Page student of the College, Scholar of Christ's and Wrenbury, student of the University, has been elected into a fellowship.

Mr. Robinson, who came up from Marlborough, gained first class in the classical tripos, part I., 1920, and in the economics tripos, part II., 1922. Mr. Robinson served during the war in the R.N.A.S. and R.A.F.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

THE R.A.F. STEEPLECHASE MEETING.

The R.A.F. Steeplechase Meeting was held at Kimble on Mar. 26. The results were as follows:—

R.A.F. LIGHTWEIGHT 'CHASE.—1st, S/Ldr. Read's "Misty" (Owner); 2nd, W/Cmdr. Barrett's "Alfred" (Owner); 3rd, W/Cmdr. Darnell's "Baldinetto" (F/Lt. Cole Hamilton). Won by 2 lengths, 4 lengths between 2nd and 3rd.

R.A.F. NOVICES' 'CHASE.—1st, F/O. King's "Still Mozelle" (Owner); 2nd, S/Ldr. Hanmer's "Retainer" (Owner); 3rd, S/Ldr. Capel's "Stoke Pero" (Owner). Won by ½ length, 3 lengths between 2nd and 3rd.

R.A.F. HEAVYWEIGHT 'CHASE.—1st, The Rev. H. Beuchamp's "Red Peter" (Owner); 2nd, Officers' R.A.F. Cranwell "Barney" (W/Cmdr. Barrett); 3rd, Air/Cmdre. Brooke-Popham's "Bishop" (F/Lt. Cole Hamilton). Won by a distance. 6 lengths between 2nd and 3rd.

ADJACENT HUNTS' RACE.—1st, Mr. Brazier's "Dormier" (Mr. Wood); 2nd, Mr. Chapman's "Miss Torley" (Owner); 3rd, Mr. Whitehead's "Kingmaker" (Mr. Wilson). Won by 1 length, 4 lengths between 2nd and 3rd.

FARMERS' RACE.—1st, Mr. Simon's "Berryfield Beauty" (Mr. Wood); 2nd, Mr. Rose's "Cleopatra" (Mr. Allen); 3rd, Mr. Bete's "Tango's Pride" (Mr. Deverall). Won by 1 length, 4 lengths between 2nd and 3rd.

Eastchurch.

THE R.A.F. ASSOCIATION CUP.—The semi-final between the Armament and Gunnery School (Eastchurch) and No. 4 Section (Halton), was played at Wendover on Apr. 11.

The game resulted in a draw, 2 goals all, after playing half an hour extra time. The score represents the game very accurately; it was a ding-dong struggle during the whole of the two hard hours of play.

The replay took place at the Naval Recreation Ground, Sheerness, on Apr. 18 before a good attendance, and resulted in a win for Eastchurch by 2 goals to 1, Attwood scoring both goals.

Halton were well cheered by a very ardent band of about 250 supporters. The game was a very good hard match and Eastchurch thoroughly deserved their win.

The teams were as follows:—Armament and Gunnery School: Cpl. Ross; AC. Owen, L/AC. Vallis; AC. Reynolds, AC. Ferguson, AC. Blank; L/AC. Goodman, AC. Attwood, L/AC. Halsall, L/AC. Hurst, AC. Gregson.

No. 4 Section.—AC. Robertson; AC. Holland, AC. Mitchell; AC. Jinks, AC. Fields, F/Sjt. Stubbs; AC. Cadger, AC. Wardle, AC. Green, AC. Dalyrimple, Cpl. Russell.

After the game the Halton team were the guests of the station at a performance of "Rafamuffins" the talented pierrot troupe of Eastchurch.

May 2 is the date of the final at Uxbridge against Cranwell which promises to be a very keen fight.

Hockey.

R.A.F. (CADET) COLLEGE v. R.M.C., SANDHURST.

Wednesday, Mar. 3, at Cranwell.

Result:—R.M.C. 4, R.A.F. (Cadet) College 1.

This match was played in good weather and the ground was in good condition and fast. For the first few minutes Sandhurst pressed hard and their forwards missed an easy chance of scoring, the shot going wide. Shortly after, their right wing put in a good shot, which was well saved by Beamish in goal. Sandhurst continued to look dangerous. From a good run and centre by the Sandhurst forwards, their right inside scored with a good shot (0—1).

From the bully off, Cranwell ran down to their circle, but a weak shot was easily saved. Sandhurst returned to the attack and after a good run by their inside forwards, their left inside scored (0—2). Beamish (G. R.) then put in a good run on the right wing and nearly scored, the ball just going wide. Even play followed and half-time came with no further score.

Sandhurst attacked strongly on restarting, but Dickens cleared well, but shortly afterwards Sandhurst scored from a scramble in front of goal (0—3). Cranwell then attacked but Fuller-Good was offside and when in a good position for scoring. Sandhurst then pressed hard, but many good centres went begging, until at last they scored with a very fine shot (0—4). Cranwell then attacked hotly and a good shot by Henry hit the post, but attacking again towards the close Addams scored (1—4). Shortly after this, no-side went.

It was a good match, but Sandhurst were faster and showed better stickwork. Our backs were slow, but Dickens at centre-half played a very good game. Fuller-Good failed to get his forwards going, and Henry was left almost unsupported, but made many fine individual efforts. Beamish did well in goal.

The team was as follows:—

R.A.F. (CADET) COLLEGE:—F. V. Beamish (Coleraine), S. H. Hardy (Malvern), B. D. J. Broadway (Marlborough), G. R. M. Clifford (St. Coumba's College, Rathfarnam, Dublin), L. W. Dickens (Clongowes Wood), W. O. Du Port (Downside), G. R. Beamish (Coleraine), J. R. Addams (St. Paul's), J. L. F. Fuller-Good (Private), J. E. Henry (Price's School, Fareham), A. H. Montgomery (Wellington).

R.A.F. Cranwell Results for March.

R.A.F. (CADET) COLLEGE.—HOCKEY: R.A.F. Cranwell (won 6—2) and (won 4—3), R.M.C. Sandhurst (lost 1—4), Boston (won 7—1 and 1—0), Trent College (won 6—3).

RUGBY: Ampleforth College (lost 0—26).

ATHLETICS: Queen's College (lost 0 events to 10), Jesus College (lost 1 event to 8).

BOYS' WING.—HOCKEY: Newark (lost 0—2), Sleaford (drawn 1—1), Stamford Grammar School (won 3—1), Boston 2nd XI (won 5—1).

RUGBY: Cadets (lost 13—20), Station XV (lost 10—16).

STATION TEAMS.—RUGBY: Newark (lost 0—13).

ASSOCIATION: *South Lincolnshire League.*—A. J. Shaws (won 4—2), Grantham Town (won 4—0), R.A.F., Spittlegate (won 4—2), Kirton Town (won 6—2), Sleaford (drawn 2—2), Boston St. Nicholas (won 7—3).

Lincolnshire Wednesday League.—Lincolnians (drawn 2—2).

R.A.F. Cup, Semi-final.—M.T.R.D., Shrewsbury (won 6—1).

Lincoln Wednesday Cup.—1st round Lincoln Wednesday (won 8—2). Semi-finnal Lincoln Butchers (drawn 2—2).

HOCKEY: Normanby Park (lost 1—6), Lincoln Depot (won 4—1), Boston (won 1—0), Boston 2nd XI (won 5—1).

NOTE.

All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

The R.A.F. Beagles (Uxbridge).

(Unofficial.)

The annual Puppy Show of the R.A.F. Uxbridge Beagles was held on Apr. 21. The results were as follows:—

Dog Hounds (7 entries): 1. Grumbler (Freeman-Garland); walked by the Officers' Mess, R.A.F., Tenlow. 2. Banker. 3. Painter.

Bitch Hounds (8 entries): 1. Gadabout (Freeman-Garland); walked by Mrs. R. Cunningham. 2. Governess. 3. Grateful.

Prizes were distributed by Mrs. H. C. Pyper (the Master's newly-acquired wife) before a large and distinguished gathering. In other words a very sporting and enjoyable show.

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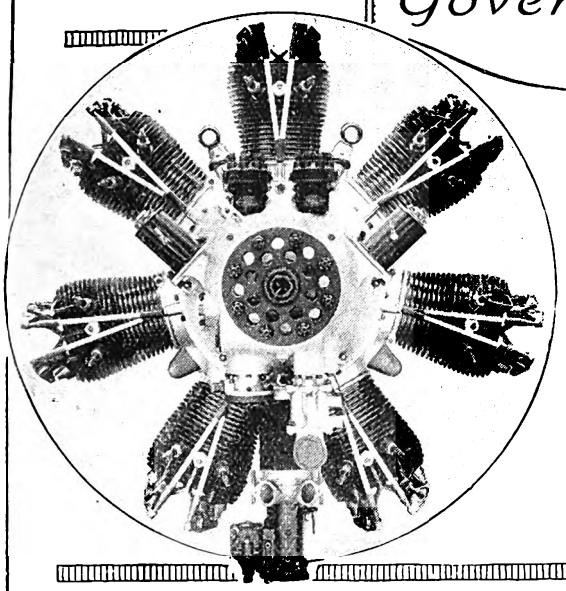

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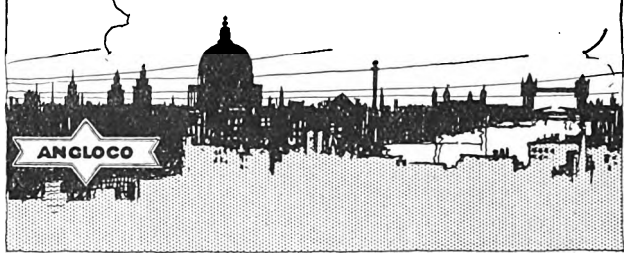

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.
ANALYSIS OF FIGURES FOR THE PAST YEAR.

TRIPS PER DAY.—Monday, 20; Tuesday, 16; Wednesday, 1; Thursday, 6; Friday, 18; Saturday, 22; Sunday, 0.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 16*, passengers 152, freight 3,950 lbs.; Air Union, machines 23†, passengers 89, freight 18,749 lbs.; Total machines 39, passengers 241.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 15*, passengers 58, freight —.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 12, passengers, Manchester-London, 31, London-Amsterdam, 5, freight —

LONDON—ROTTERDAM:

K.L.M., machines 15, passengers 35, freight —.

SPECIAL MACHINES: LONDON—BRUSSELS:

S.A.B.I.N.A., machines 2, passengers 1.

Total number of trips by British machines: 45, carrying 246 pas
Foreign machines: 40, carrying 125 pas.

STATISTICS.

For week ending April 29:—

Machines, 83; Passengers, 371; Crews, 131; Total Personnel, 502.

Corresponding week last year:—

Machines, 104; Passengers, 193; Crews, 134; Total Personnel, 327.

Corresponding week, 1921:—

Machines, 52; Passengers, 206; Crews, 66; Total Personnel, 272

Corresponding week, 1920:

Machines, 44; Passengers, 44; Crews, 46; Personnel, 90.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

The Summer Services are now in full operation and most firms are now running double services each way. On Monday of this week Mr. Hinchliffe took the first Daimler D.H.34 to Berlin on the regular service reaching Berlin in just over six hours' flying time.

The service run by the Daimler Airway will be bi-weekly in each direction, and the German Aero-Lloyd will run a bi-weekly service as well, so that Wednesday, Saturday and Sunday at present will be the only days on which a Berlin machine will not leave Croydon.

The Daimler Airway, in addition, will make a double return trip daily to Amsterdam.

Handley Page Transport Ltd. have now got the old original W8. back, fitted with Rolls-Royce engines. Experiments were tried at Cricklewood with un-geared Rolls-Royces but these were not successful, so standard "Eagles VIIIs" are now installed. The performance of this machine will not be quite so good as the new W.8b as she is considerably heavier.

Much amusement has been caused at Croydon by Mr. Alan J. Cobham's terrifically thrilling accounts in the *Daily Sketch* of his latest tour. It is considered that provided the *Sketch* can provide enough space there need be no limit to the size or design of eagle by which Mr. Cobham will be attacked when crossing the Pyrennees on his way home. So far Mr. Cobham has escaped this form of attack, but where every other pilot has met eagles surely he cannot be exempt.

The C.M.A. Air Lines consignments of freight continue to increase and this week they have carried 18,749 lbs. Mr. Grosfils points out that they book practically all this themselves and a negligible quantity is handed over to them by other air lines. They have set themselves out to be *the* freight-carriers between Paris and London and have captured the bulk of the traffic.

On Thursday of last week Lt.-Col. G. L. P. Henderson flew to Plymouth on one of the Surrey Flying Services' D.H.9s in connection with Group-Captain H.R.H. the Duke of York's wedding. During the week Messrs. Muir and Hayden have been carrying joy-riders in the reconditioned Avros.

On Monday of this week officers of the French School of Navigation visited the Aerodrome in a military "Goliath." Flying Officer Hamilton, R.A.F., arrived in a D.H.9a in connection with their visit. He left later with a good "zoom."

Mr. Lloyd is making considerable alterations and improvements to the Trust House. The grass and flower-beds have been made really attractive and the old officers' mess has been acquired. The space between two wings of this is being roofed over with glass and turned into a palm court. Special catering arrangements are being made for parties or schools visiting the aerodrome.—G. D.

Manchester.

In last week's Manchester notes one inadvertently stated that Messrs. Dickinson and Elwell were doing most of the joy-riding. One should have said that this was done by Messrs. Dickinson and Newnham.

Throughout the past week Messrs. Dickinson and Newnham have again been hard at work carrying about 100 passengers per day in spite of the cold and high winds and on Saturday about 4,000 people paid for admission to the aerodrome. The pilots were kept hard at it from 11.00 hrs. until about 18.00 hrs. when it began to rain and hail.

On Sunday the police band was in attendance, and under its influence Mr. Dickinson took up a large number of passengers and indulged in photography.

Some machines of the De Havilland Hire Service have been busy at the aerodrome during the week.

ROYAL AERO CLUB DOINGS AND MISDOINGS.

Lieut.-Col. F. K. McClean, A.F.C., was unanimously elected Chairman of the Royal Aero Club at a meeting held on Apr. 18. It is sincerely to be hoped that Colonel McClean who is remarkable for his sound commonsense and foresight—as was proved years ago by the way in which he made it possible for the first Naval officers to learn to fly—will have a salutory influence on the Committee of the Royal Aero Club, which of late has made so many amazingly silly mistakes.

The first thing that he can do with advantage is to make up the Committee's mind for it that the right place to hold the Schneider Cup Race is at Lee-on-Solent, which has been offered to the Club by the Royal Air Force, and not at Cowes which is the least alluring of all possible places at which to hold the race.

Another good thing he can do is to induce the main Committee of the Club to alter the Gliding Committee's absurd decision to call low-powered aeroplanes "motor-gliders," which is precisely the one thing which they are not.

He might also induce the Committee to announce officially the fact that the Competition for the Duke of Sutherland's Prize and the Competition for the prize subsequently offered by the *Daily Mail* are two separate affairs and should not be confused in the public mind.

Furthermore he might persuade the Committee to see that both these Competitions rightly come under the Racing Committee of the Club and not under the Gliding Committee, in that the machines concerned are purely light aeroplanes and are not gliders.

At the same meeting of the R.Ae.C. Committee Lieut.-Colonel John Dunville, C.B.E., was elected Vice-Chairman of the Club. Colonel Dunville is a business man of vast experience and a first-class sportsman. It is hoped therefore that

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he also will endeavour to instil a reasonable amount of common sense and sportsmanship into the various Committees of the Club.

Purely on a point of good English one would like to suggest to the R.Ae.C. that the prize so generously offered by His Grace the Duke of Sutherland should be known either as "The Duke of Sutherland's Prize" or as "The Sutherland Prize." It strikes one as obviously wrong to call it "The Duke of Sutherland Prize" as it appears in the Club's official communiqués.

The Air Ministry has offered a grant of £500 to the Royal Aero Club towards the expense of establishing permanent quarters for the encouragement and development of gliding. The Committee of the Club has instructed the Secretary to report as to a suitable site and as to the cost of shed accommodation.

The R.Ae C. Committee has decided that no race meeting will be held at Whitsuntide this year. This is possibly a wise decision as it will enable the members of the Club to visit the motor race meeting at Brooklands undisturbed by qualms of conscience on the score of neglecting aviation. One can only hope that the members may win enough at Brooklands to enable them to attend the numerous and widely-scattered aviation events which will crowd the rest of the Summer. Also it will enable some prominent members to go aero-golfing instead of aeroplaning

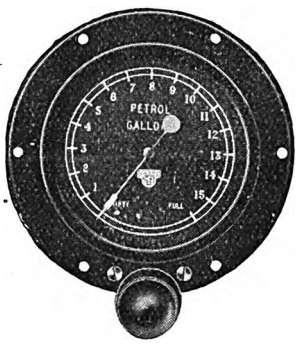
The Race for the Grosvenor Challenge Cup will take place on Saturday, June 23. It is natural that the Committee of the Royal Aero Club should fix on such a date as it is only a week before the R.A.F. Pageant and on the eve of the International Air Conference, which will occupy the whole of the following week.

The result of stuffing the most important aeronautical events of the year into such a short period will undoubtedly be to give all the non-technical papers an acute attack of aeronautical indigestion with the result that the events will not receive anything like the attention which they deserve and would have got if they had been spread over a longer period.

The Committee of the Royal Aero Club really deserve to be congratulated on having at any rate equalled bogey, if not on having created a record, in administrative *faux pas*, so numerous have been its errors of omission and commission. In fact it might very well be known in future as the Royal Error Club.—C. G. G.

Instrument Chats

(No. 1.)



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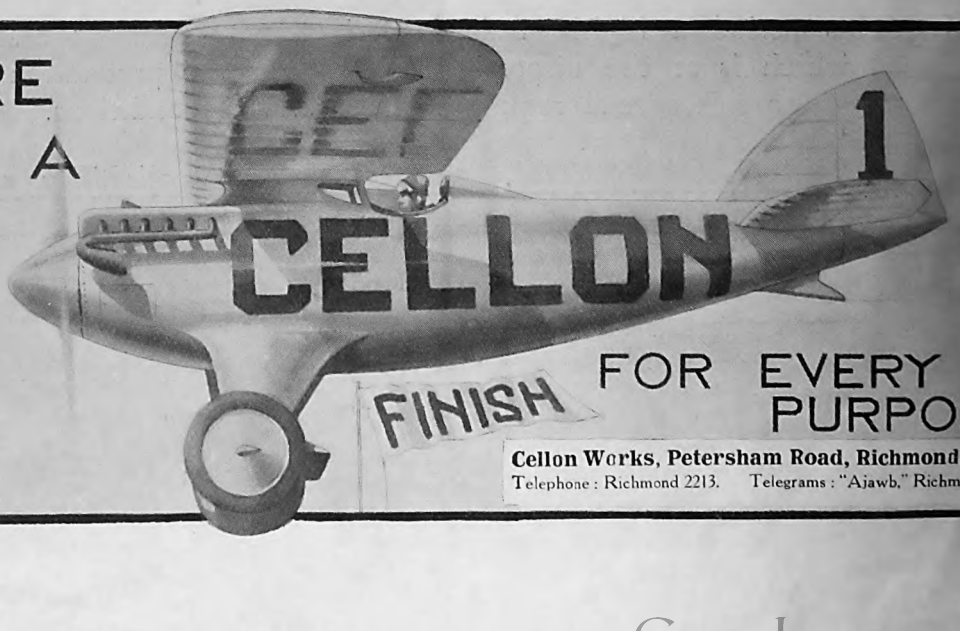

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THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, MAY 9, 1923.

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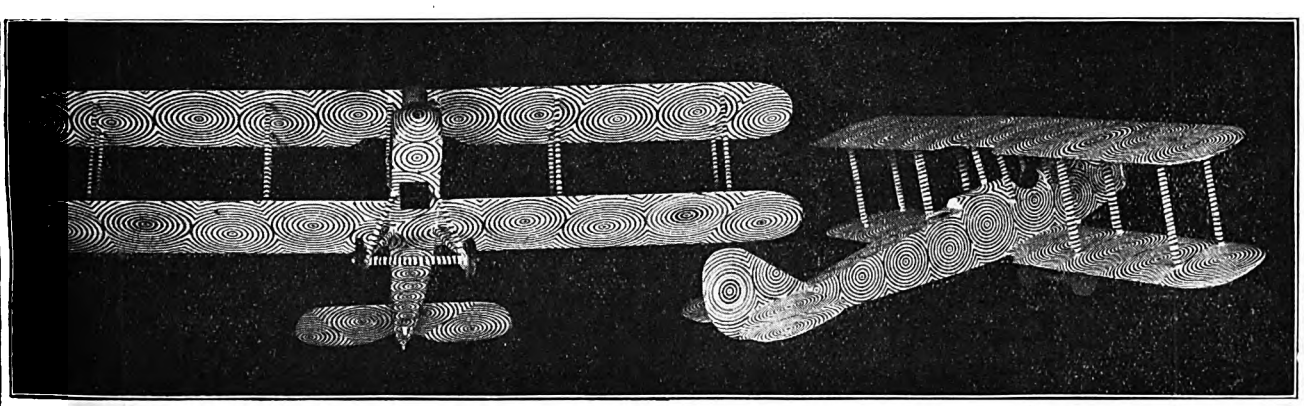
A PRESENT HORROR OF THE TIME.



DAZZLE-PAINTING:—Shakspeare has said:—"Art thou . . . but a false creation proceeding from the heat-oppressed brain?" and "Take the present horror from the time." But Shakspeare had not seen this example of a dazzle-painted D.H.9a, or he might have been inspired to more emphatic language. The perpetrator of this optical outrage is Mr. C. F. Snowden-Gamble, and it is said that the man whom he detailed to do the painting is in a home for mental incurables. Unfortunately the design was too late for the war, for it would certainly have caused many ophthalmic casualties among enemy aviators.

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ON THE AIRCRAFT TRADE AND AIR POLICY.—V.

An Important Event.

Before proceeding to consider further the views of pilots and others on Civil Aviation it is fit and proper to deal first with a very important disclosure made at the Annual Dinner of the Institute of Transport on Thursday last by Lieut.-Col. Wilfred Ashley, M.P., Parliamentary Secretary of the Ministry of Transport.

It is particularly worthy of notice that the *Times*, the *Morning Post* and the *Telegraph* in their notices of the dinner all fastened on Col. Ashley's references to Civil Aviation as being the most important subject in all the lengthy speeches. In fact they hardly mentioned anything else. This shows clearly the increasingly important part that Aviation is taking in the affairs of the Empire and in our National life.

The Air Transport Industry was worthily represented at the dinner by Sir Henry White-Smith, K.B.E., who is a member of the Council of the Institute, but it was a pity that apart from oneself no other members of the Aircraft community were there, for if they had been they would have been considerably gratified by the way in which Colonel Ashley dealt with Civil Aviation, making of it, as he did the leading feature of what was in fact the speech of the evening; seeing that he was the guest of honour and was proposing the toast of the Institute of Transport and the Transport Industry.

Incidentally it was interesting to note that Colonel Ashley had evidentally so laid to heart Kipling's dictum that "Transportation is Civilisation" that he repeatedly said 'Civilisation" when he meant "Civil Aviation," and corrected himself. He need not in fact have done so for we might well paraphrase Kipling and adopt as the motto of the Department of Civil Aviation or of the Million Pound Monopoly Company, if and when it comes into being, the phrase "Civil Aviation is Civilisation." It is a trifle hard to say, but not at all hard to believe.

For the immediate present the safety of our Empire and the life of the Aircraft Industry depends on the forming and equipping of a big Air Force, but when the great race-war between Western Civilisation and Eastern Barbarism has been fought and won by us then Civil Aviation will be the mainspring of Civilisation. The civilian aeroplane is of little real interest to the Aircraft Industry at the moment but after the war it may well be the best possible Dove of Peace.—By-the-way. Has anybody tried using olive-wood for airscrews. It seems the appropriate material. However, let us return to our dinner, which though it provided excellent entertainment for some 270 people must have caused annoyance to a good many more, seeing that it was held in the Savoy Ball-Room on that famous spring floor where a week before sundry people joyously celebrated our Royal Group-Captain's Wedding.

The Great Disclosure.

Col. Ashley after referring to rail and road and water transport turned to air transport and stated definitely that the Government attached very considerable importance to the development of Civil Aviation. Now if such a statement had been made by the Secretary or Under-Secretary of State for Air or by that valiant propagandist the Director of Civil Aviation it would have been quite natural, for it is part of their respective jobs to emphasise the Government's interest in and affection for Aviation in all its manifestations. But coming as this did from a Minister of a Department which has no direct concern with Aviation it is doubly important.

As a matter of fact the Ministry of Transport has every reason to be hostile to Aviation, for by all the laws of common sense it ought to control Civil Aviation just as much as it controls civilian railway work or civilian road transport. And contrary to all laws of common sense Civil Aviation has been put under the control of what ought to be a purely militant Ministry. It is perfectly rational that there should be three Ministries to control respectively Air War, Sea War and Land War, but there is no more reason for the Air Ministry to control Civil Aviation than there is for the Admiralty to control merchant shipping or for the War Office to decide (in the interests of comfortable route marching) whether we shall walk on the right or left of the pavement. Yet in spite of all this Colonel Ashley as representing the Ministry of Transport felt entitled to express the Government's views on Civil Aviation.

The Order of Precedence.

Not only did Colonel Ashley give Civil Aviation his Departmental blessing but he took upon himself to set forth the order of precedence in which the Government places the freight of civilian aircraft. He said definitely that the Government regards mail-carrying as the prime reason for the existence of air lines. Next he said that the carriage of parcels or goods was of importance. And last of all he placed passengers—if they could be got.

Now that is a thoroughly sound view and one with which one feels sure that our excellent Post-Master General, Sir William Joynson-Hicks, will agree cordially. The Baghdad-Cairo mail route despite all its imperfections of organisation and equipment as compared with such a concern as the Daimler Airway has demonstrated conclusively the advantages of air transport of mails. The Daimler Airway has demonstrated quite as conclusively that perfect organisation and equipment can make an air line as reliable at any rate as a steamship line if not qutie as reliable as a railway. Therefore there is now sufficient reason for entrusting mails as a matter of course to an air line, provided it be up to Daimler standard.

When His Majesty's Mails are entrusted to an air line the ordinary sender of light and valuable and urgent goods need not hesitate about sending them by air. Even such things as bankers' drafts and bearer bonds may then be sent by air, for it will be possible to insure them at reasonable rates seeing that they only have to be insured against total loss and not against damage as well.

One of the best reasons for developing air lines primarily as mail and light goods carriers without regard to passengers is that they can be equipped with small and fast aeroplanes which cost much less to build and much less to run than do the great multiple-engined "air-liners" which because of their size appeal most to the short-sighted imaginations of the daily news-sheets. Mr. Handley Page is of course quite right in his dictum that it is easier to get 140 lbs. of passenger to travel from London to Paris than it is to get 140 lbs. of goods for the same journey. But it will be vastly easier to get 1,400 lbs. of mails and parcels to travel from London to India by air than to get ten passengers at once to pay the enormous price for the same trip. Therefore Colonel Ashley is perfectly right in putting passengers last in the list of freight for any real air-line, as differentiated from a glorified joy-ride like that from London to Paris

The Big Scheme.

Nextly Colonel Ashley stated quite definitely that the Government has a plan for and desires to start as soon as possible an air line from this country via Egypt and Mesopotamia to India, with the idea of extending it ultimately to Australasia. This fits in with the statement made by the Duke of Sutherland at Woking last week to the effect that he had been working on a scheme for an air line which would carry mails from London to India in 72 hours. So evidently the Department of Civil Aviation and the Ministry of Transport have been (in the strictly literal sense) conspiring together on this subject.

The England-India-Australia, if possible All-Red, air route to Australia has long been the pet dream of Mr. Holt Thomas, who must always be regarded as the true pioneer of Civil Aviation in this country. This same route may possibly account for the presence in Italy on Thursday last of Mr. Handley Page when he ought to have been representing Aviation at the Transport Dinner, for the line via Egypt can only be a development and extension of the London-Paris line which has always been Mr. Handley Page's speciality.

As one has often pointed out in this paper the proper route to India is by way of Köln, München, Vienna, Buda-Pesth and Constantinople, and thence by the great Turkish mili-

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tary road to Mosul and Baghdad. But with an eye to the strategy of the next war with its irregular and open fighting line stretching from Danzig to the Adriatic, which would rather cramp the style of a machine flying from the territory of our Allies in Eastern Germany over the Klagenfurt Area and the Balkans, it is now clear that in order to ensure our air-line communications during that war it will be better to develop the Mediterranean Route to Cairo or possibly to the new Port of Jaffa (when the execution of existing contracts have made it a possible flying-boat station) and thence by the Desert Route to Baghdad.

An Imperial Affair.

Finally Colonel Ashley said that Civil Aviation would be one of the most important subjects to be discussed at the Imperial Conference in the Autumn. Nobody at the Air Ministry has made such a statement so it may be assumed that Colonel Ashley had some special mandate from the Prime Minister to disclose this fact. It is a lamentable fact that the British Dominions do not, so far as can be seen, understand the importance of Aviation.

Canada is far ahead of the others. Thanks to several brilliant men on its late Air Board much valuable work has been done in the Dominion in the way of forest patrol and survey operations by Canadian Air Force personnel. Also the ground-work of a highly efficient militant Air Force has been laid. But now the Air Board has been abolished. The Royal Canadian Air Force, with its new regal title, has become a mere branch of the Militia. And the ambitious but economical civil air service programme has been cut down to a mere skeleton by politicians who miss being statesmen by pretty nearly the width of the map of Canada.

Australia, which started with the idea of having a strong coast-defence Air Force—on the sound principle that for the price of a battle-ship it could have an Air Force capable of sinking a whole enemy fleet—has whittled its seaplane equipment down to a mere joke, in the interests of false economy. And the latest one hears is that in their own interests the heads of the Royal Australian Air Force are setting up a species of Royal Aircraft Establishment where they intend to build their own aircraft, and are thus compelling mere Trade constructors to shut up shop. On the other hand the Australian Government is giving fairly adequate support to at least two air-mail lines and is preparing to back others.

The New Zealand Government has been merely fatuous. It had a quantity of useful aeroplanes presented to it after the War 1914-18 by the Air Ministry and it has simply let them rot in their cases.

South Africa has done better with the machines which were similarly presented to its Government. Sir Helperus van Ryneveld has made something like a useful Air Force and has used it with good effect in the Bondelswartz rebellion and in the Bolshie rising on the Rand. But the South African Government has shown no signs of intelligently appreciating the value of mail services between Pretoria, Johannesburg, Bloemfontein, Kimberley and the great seaports of the Union.

India is perfectly hopeless. Neither the Army High Command nor the Government seems to have the faintest notion of the value of aircraft for any purpose. The R.A.F. in India has done its work in spite of the C.-in-C. and the Government. And Civil Aviation in India does not exist at all.

Truly the history of Aviation in the British Dominions Overseas, where above all elsewhere there are great opportunities for Civil Aviation, is a lamentable tale. Therefore it is earnestly to be hoped that at the Imperial Conference our extremely able people at home, such as Sir Samuel Hoare and the Duke of Sutherland and, let one add, Colonel Ashley will impress on our Colonial politicians who fancy themselves as statesmen that an adequate Air Force is as much their affair as ours and that in their wild dominions Civil Aviation is Civilisation even more than it is at home.

Signs and Portents.

From this it may be seen that Colonel Ashley's comparatively brief adventure into the realms of Civil Aviation is of very much greater import than was apparent on the surface. Intelligent readers of this paper, especially young readers who are likely to be concerned personally in the next war, will do well to make a mental note of his four points, (*a*) The Government intends to develop Civil Aviation (*b*) It regards mails as the prime object (*c*) It intends to organise the Mediterranean route to India and (*d*) It intends to make Civil Aviation a leading subject at the Imperial Conference in the Autumn.

Few people knew when Admiral Fisher began building "Dreadnoughts" that he did so because their existence would delay the war with Germany till our fleet was more nearly ready for it and until the Russian strategic railways became workable. To meet our "Dreadnoughts" Germany would have to build ships as big. Such ships would be too big to pass through the Kiel Canal from their shelter in the Baltic to battle in the North Sea. So Germany could not make war until the Canal was widened and the big ships were built. Which delayed the war till the Russian railways were almost ready. Germany hurried the beginning of the war to prevent the railways from being completed—and lost it.

Few people knew outside the General Staff that five or more years before the war the position of the British Expeditionary Force on the left flank of the French Army had all been arranged between the French and British High Commands and that debarcation ports and railways in France had all been allocated to the B.E.F. Still fewer knew that even earlier a certain Lieut-Col. Douglas Haig—now an Earl and a Field-Marshal—had drawn up complete movement orders for the transportation of the Indian Army to Europe for such a war and that on the outbreak of war those orders were just taken from a pigeon-hole in an office at Simla and put into operation.

We are a silly, good-humoured, somewhat obtuse people but we have always the few necessary big men to see that we do the right things at the right time and that we are ready to do them. It is never the fault of those big men when their preparations only exist on paper. It is then the fault of the politicians who want money for schemes which will catch more votes than will the defence of the Empire.

If our Air Council had its way we should have the biggest Air Force in the World as well as what we have, the best. As it is the Air Council can only lay schemes for the future. And Colonel Ashley has indicated one direction in which the Air Council is obviously co-operating with other Government Departments with a keen eye on the near future.

To Return.

And so we may return to our symposium (an imposing word that) on the Million Pound Monopoly Company.—

After so much grave commercial consideration it seems well to give the views of a few people who have the habit of seeing life lightly because they live it seriously. Few will dispute Mr. Frank Courtney's right to speak—and *vis à vis* Mr. Courtney few people find it worth while doing so. Generally speaking (*more suo*) Mr. Courtney has had a more varied experience than any other pilot engaged in Civil Aviation. Primarily an engineer, draughtsman and designer, he became an extraordinarily good war-pilot after enlisting in the R.A.F.

Though very short-sighted physically he managed to wangle his way to France and did a lot of fighting in the air against the Germans and nearly as much on the ground against stupid commanding officers. He was sent home and became one of our very best test-pilots and air-line pilots, but he still goes on fighting in a most joyous way with everybody and anybody. Incidentally he comes from the County Cork which explains him somewhat, though nobody would dare to excuse him, for like all the Norman Irish he prefers to fight his own quarrels.

On matters of aircraft design, operation or policy he is as far-sighted mentally as he is short-sighted physically and though he has the habit of expressing himself rather after the manner of his most distinguished countryman, Mr. George Bernard Shaw there is nobody in Aviation whose opinions on any subject are better worth having, if only so that one may disagree from them. Mr. Courtney says:—

"A big monopoly is always a serious thing, as I am reminded every time I pay two-shillings for nine-pennyworth of petrol. Therefore, when an official committtee of business men recommend such a vast thing as a ten-year monopoly of commercial aviation it must either be a reasonably sound scheme or it must have been founded on incorrect assumptions. And I feel convinced that the latter is the case.

"I am presuming that roughly the idea is that before aviation can be a sound self-supporting industry it has a vast amount of development to go through and great difficulties to overcome. And this is supposed to be so serious as to necessitate the elimination of competition and to require ten years.

"I do not believe at all in the vastness of these difficulties. There will not be any air transport until machines can fly day and night with the same safety and in the same weathers as in the case of boat and train. And I am convinced that this can be done with no better equipment than can be provided at present if proper experimental work in air transport be carried out. And the cost of such experiments would be *only a fraction of the proposed* £500,000 which the Government is to supply as capital.

"When these experiments are done, as they should be done, at Government expense then air transport will merely begin. *There has never yet been any Air Transport.*

"There has been a strange system whereby on dangerous aircraft foreign trippers have been carried about provided the weather was nice and fine. Therefore before the tremendous step is taken of granting a monopoly of air transport, let us have a try and see if the public will support air transport by showing them a sample.

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Schneider Cup for Seaplanes.
Won by Napier engined Supermarine.

NAPIER

450 h.p. Aero Engine.

"There is not another aero engine constructed which has such a great record."

Tatler, 21-3-23.

In the last British Government aircraft competitions, the only engine fitted to the machines to secure the highest prizes in all three classes was the 450 h.p. Napier.

Aerial Derby Handicap, 1921.

Aerial Derby 1921.

The Six cylinder Napier motor carriage is as satisfactory and reliable on the road as the Napier aero engine is in the air.

D. NAPIER & SON. LTD.
14, New Burlington Street, W.1.
Works: ACTON, LONDON, W.3.

Aerial Derby, 1922.
Winner—Napier engined Gloucestershire.

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"The public *will* support it, which means that it will probably pay its way. Or if, for various reasons such as the present high cost of matériel, the cost does turn out to be any higher than what the public will pay, then perhaps subsidies might be continued until such costs are likely to be reduced. But I am convinced that, when the seats of the aeroplanes are being filled this will be unnecessary.

"I am sure that the scheme would never have been recommended if there were more people who understood both the technical and the business sides of aviation. But this dual capacity is very rare, although the almost explosive development of aviation has made it so necessary.

"From the point of view of personnel, I am sure the monopoly scheme would be disastrous. Anyone who has thought about this can see that fact.

"Monopoly, even when confined to particular routes, is not very satisfactory. And when aeroplanes really fly in such a manner as to provide revenue then competition will be all the more necessary. And, I repeat, aeroplanes can with the expenditure of a little money on experiment be made to produce revenue."

A Philosopher.

Following Mr. Courtney one feels impelled to publish the reflections of Captain H. Spry Leverton who directs so effectively the interests of the Koninklijke Luchtvaart Maatschapij, commonly known as the K.L.M. or Royal Dutch Air Service Company, in this country, Captain Leverton as well as being a sound business man happens to be a philosopher whose outlook is as free from illusions as is that of those two other eminent philosophers Mr. A. W. Baskomb and Mr. Lester. His views on Civil Aviation are neither conventional nor unduly optimistic, but they are well worth serious consideration. In response to a request for his opinions on Civil Aviation in general he says :—

"I am sending you a Calendar issued by our Agents, which, together with the fact that our delivery vans bear the legend 'To Holland by Sea or Air,' and carry posters both of the Batavier and K.L.M. lines, may possible strike you as interesting. As yet we are perhaps the only Aviation Firm which has contracted a firm business alliance with a big shipping Firm running to the same country and even to the same port.

"Is it not likely to inspire the public with that confidence which at present they lack, and to put the Air Line upon a serious and business-like footing in the minds of business people when they realise that a big shipping firm, known for their business ability in three or four countries, have sufficient faith in an Air Line definitely to place it on a par with their shipping lines and even to emphasise that faith on a Calendar designed to last for one year, in three colours?

"Were you to wander into one of those cafés round Mark Lane way, into which the Business Man rushes for a cup of coffee hastily gulped down and where he usually spends an hour or so over a hurried game of dominoes from about 11.30 until he speeds away for a rush lunch, and supposing you were so rash as to mention Aviation, you would probably be beaten unconscious with a copper-topped table. But, were you to preface your remarks with a few jests about a solid Shipping Firm well known to all the habitues, you might merely be requested by the management to leave at once.

"This of course is merely a minor advantage of an intimate connection between Shipping and Aviation; because hoping to be accepted as a more or less sane member of some decent Billingsgate Fish Farm, one does not babble childishly of frivolities in City cafés, but rather, having first smeared oneself with cod-liver oil, one enters with confidence, carrying if possible a basket of sprats upon one's head, thus assuming local colour and avoiding undue comment.

"Should you therefore at any time feel disposed to sift the grain from the chaff on this subject, you might pour forth much wisdom, and failing the arrival of an all-Yaeger biplane with the redoubtable Doctor at the stick, and the Coal magnates, suitably be-Yaegered as passengers, and feeling that the absence of the weakly Hun leaves a news vacuum, the germ of a small article contained in this mass of verbosity may prove of use."

The grain to be extracted from Captain Leverton's chaff is that a firm alliance between existing interests which are already on a sound footing and an air-line is the best possible method of developing Civil Aviation. With this one agrees most cordially. If Civil Aviation were left to fly by itself—as Mr. Churchill recommended—we should in due time reach a point where big business interests would perceive the benefits which they can derive from air transport, just as after many years the railways have discovered the uses of motor transport. Then we should have more money for the Royal Air Force and should waste nothing on air-line subsidies.

(To be continued.)

THE KING'S CUP, 1923.

His Majesty the King has again been graciously pleased to present to the Royal Aero Club a Cup for an Air Race during the present year. His Majesty has approved the conditions which are similar to those of the Circuit of Britain Air Race last year.

The aeroplane and engine must have been constructed in the British Empire and the pilots must be British subjects, The Race, which will be on handicap, will extend over two days viz. Friday and Saturday, July 20 and 21, starting and finishing at the London Aerodrome, Hendon. The following towns are included in the circuit :—Birmingham, Newcastle, Glasgow, Manchester, Bristol.

It must be noted that there is no regulation that the entrants must be British subjects, whether by birth or by naturalisation.

THE R.A.F. AT THE ROYAL ACADEMY BANQUET.

The Secretary of State for Air, Lt.-Col. Sir Samuel Hoare Bart., speaking at the Royal Academy Banquet, said :—

I am grateful to the President and the members of the Royal Academy for including the Royal Air Force, the youngest and smallest of the three fighting Services, in this distinguished toast.

Gentlemen, being a young Service, encompassed with many difficulties, we have our full share of problems to solve in the immediate future. What for instance should be the standard for our air defence? How is the Force itself best to be organised?

These, observe, are new questions to which politicians and the public have hitherto given scant attention. The Air Force was improvised for the War and splendidly it acquitted itself. Its place in Home Defence and its peace-time organisation are questions which have never been settled, indeed until the last few weeks they have scarcely ever been discussed. It is to these two questions that I am constantly addressing myself, and it is to these two questions that I would ask the attention of the representative assembly that is gathered here to-night. I should trespass upon your patience if I attempted to elaborate answers to them, and if I do not trespass upon your attention, it would be unprofitable for me to give a useful reply until the Committee of Imperial defence has finished its inquiry into them.

Permit me, however, to make one single observation, and I believe that it is an observation of the first importance.

If an expansion of the Air Force is to take place, and I believe that when the facts are fully weighed an expansion of the Royal Air Force is bound to take place, there is one condition that must be fulfilled. The expansion must be so organised as to make aviation and air defence an integral part of the life of the Nation.

Home Defence on land ceased to be the exclusive province of a profession, when first by the volunteers and secondly by the Territorials, mainly due to the efforts of Lord Haldane, it entered into the life of the civilian population. Whilst there are obvious difficulties in the way of a similar development of the Air Defence, I none the less say, and I say quite definitely, that though the brunt of home defence will always fall upon the highly-trained regular squadrons, a definite place should be found for the growing number of men of every class, sportsmen and scientists, engineers and artisans, who year by year are taking a keener interest in aviation.

Only in this way will the air sense of the Nation, supported as I hope by the expansion of Civil Aviation, become as deep and general as the sea sense of the Nation. Only in this way can we develop to the full our home defence against air attack, on the one sound principle upon which we have not only organised our Home Defence in the past, but upon which we made it possible for the Nation to win the War, namely, that civilian and territorial have their definite place to play in it.

In this way there will come about a real National Air Force, deeply embedded in the national life, fully capable of undertaking the Imperial duties to be placed upon it, and no less capable of carrying out the even more important duty of the defence of these shores against air attack.

ACROSS THE STATES.

On May 2 Lieuts. J. A. Macready and Oakley Kelly, U.S. Army Air Service, left Roosevelt Field, Hempstead, N.Y., on the Fokker T.2 monoplane (400 h.p. Liberty) and landed at Rockwell Field, San Diego, Cal., covering the total distance of 2,650 miles, non-stop, in 26 hours 50 mins.

They left Roosevelt Field at 13.37 hours on the 2nd inst. after one false start, the T.2 with its load of 10,850 lbs. failing to rise more than 4 ft. in half a mile. The actual start nearly ended in an accident, the T.2 just clearing the hangers at the far end of the aerodrome. They passed over St. Louis, Mis., at 23.15 hrs. and landed at Rockfield Field at 16.28 hrs. (N.Y. time) on May 3. They took off with 737 galls. of petrol, 35 galls. of oil and 35 galls. of water. This is the first non-stop flight across the United States, although these two officers on the same machine have made two previous flights of over 30 hours' duration.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The general possibilities of the type of aeroplane which is fitted with a motor-cycle engine seem to be very considerably mis-estimated, even by those who should be able to estimate them with complete accuracy.

A general consideration of the design of such machines is therefore given in a series of notes which begin below.

A very interesting design for a low-powered machine of this type, due to Major O. T. Gnosspelius, is described in this issue. This machine, which is now nearing completion, is the result of Major Gnosspelius' experiments in aerodynamics carried on with the aid of the ingenious pendulum device described in this paper some months ago.

The machine was designed and put in hand quite independently of the recent offers of prizes for machines of this power, but it will almost certainly compete in the forthcoming contests.

THE DESIGN OF LOW-POWERED AEROPLANES.

By W. H. Sayers.

The low-powered aeroplane—that is to say the machine of the type which is eligible to compete in the contests for the Duke of Sutherland's prize and for other prizes under similar limitations—is so much in a class apart from the normal type of aeroplane that the average designer—not to mention the average pilot—seems to have very vague ideas as to what is and what is not possible of achievement with such machines.

As a matter of fact the low-powered aeroplane is just an aeroplane, and its performance is governed by precisely the same laws as those which apply to its more powerful brother, the ordinary aeroplane of war or transport.

When however one comes to consider in detail the design of such a machine, it is found that there are numerous matters, more or less of detail, which have quite a changed bearing on what might be called "design policy." There is nothing surprising in this fact. In designing a speed record machine certain factors which influence design generally have a vastly greater importance than those same factors would have in the design of a machine intended to transport a commercial load over a long-distance stage with the maximum economy.

When the problem before the designer is that of producing a machine which will carry one man satisfactorily with the minimum possible expenditure of power it is not surprising that a similar change in the bearing and importance of some of the factors which influence design should occur. The problem however being one outside the range of ordinary design experience the exact nature of the changes which occur are not always immediately obvious.

An Old Problem in a New Form.

In some sense the problem is not altogether new. In the early days of flying the chief problem was that of flying with the engines then available—which were of distinctly limited power. And in fact some of the earliest aeroplanes did fly carrying 40 and 50 lbs. per b.h.p. of engine.

The low-powered aeroplane of next autumn will have to fly at 50 lbs. or more per h.p. actually utilised. But there is a difference, for whereas the 1909/10 machine just flew with no reserve power at all, the modern, low-powered machine is expected to have an ample reserve of power.

The essential difference lies in the accepted definition of flying "satisfactorily." One was satisfied if one got off the ground in 1910. On the same weight per h.p. one will expect quite a wide speed range, a quick "get-off," and a steep climb, to-day.

The problem is best considered by starting from first principles. If one wishes to fly with the minimum power obviously one should consider what determines the power necessary to fly.

As is well known the power necessary for flight on any machine is the product of thrust by flying speed. And thrust is simply resistance. Therefore one can reduce the power necessary for flight indefinitely if one can reduce either resistance, or speed, or both, without limit.

Resistance depends on the shape of the particular aeroplane, and also on its speed. For any number of aeroplanes of precisely the same shape moving at precisely the same angle of incidence the ratio of lift to drag is constant and independent of either the size or the speed of the particular machine. This neglects the minor influence of the so-called "scale correction" which is for most cases at any rate quite unimportant in so far as this argument is concerned.

Speed and Power.

For these similar aeroplanes both lift and resistance increase as the square of the speed. And as the h.p. necessary for flight is proportional to the product of resistance by speed, it is obvious that h.p. increases—for similar shaped aeroplanes—as the cube of the speed while the lift—or the total weight which can be carried—increases only as the square of the speed. It follows that the weight per h.p. which can be carried varies inversely as the speed of flight.

From this it is possible to see at once the possibilities of carrying very much increased weight per h.p. by merely reducing speed. Take the case of a representative commercial passenger machine, weighing 6,500 lbs. fitted with an engine of 450 h.p., and with a top speed of 120 m.p.h. The weight per h.p. is 14.5 lbs.

A machine of precisely the same size and external form, flown at the same angle at half the speed—that is at 60 m.p.h.—would lift one-quarter the weight—1,625 lbs.—for one-eighth the h.p., or 56 h.p. The weight per h.p. rises to 29 lbs—just double the original value.

Such a machine would have the same relative speed range as the original—that is its landing speed as well as its top speed would be halved, its ceiling would be the same, and it would have the same angle of climb—half the climbing speed at half the flying speed—as the original. That is it would not be an under-powered machine in the ordinary sense of the word at all.

Naturally nobody would propose to take a machine of this type as a model for a low-powered aeroplane. But the example is given merely to show that quite apart from improvement in aerodynamical design, reduction of speed leads at once to a large increase in the ratio of Weight/Power at which flying is possible.

Cleanness.

With any improvement in the L/D ratio of the machine, a corresponding decrease in the power, and an increase in the Weight/power ratio for level flight at any given speed occurs.

The L/D ratio of the average commercial biplane does not greatly exceed 8/1. If instead of using the commercial biplane as a model one substitutes for it a clean cantilever monoplane with a 16/1 L/D ratio the h.p. needed for 60 m.p.h. would again be halved, and the weight per h.p. would be doubled.

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This is by no means impossible—but it has to be pointed out that for practical purposes it would not be possible to take full advantage of this improvement by halving the h.p. actually installed. For although it would leave the top speed unaltered, it would halve the margin of h.p. available for climbing, and would halve the climbing speed and the climbing angle. Two-thirds of the original h.p. would be needed to give the same climb—and there would be as a result an increase in top speed.

THE PRACTICAL IMPORTANCE OF WEIGHT.

It is also obvious that from the practical point of view the weight per h.p. is not a sound basis for comparison. For nobody wants to carry aeroplanes about just for their own sake. The weight of useful load carried per h.p. is the true basis on which to estimate the practical value of two different machines—and even then the whole performance of the two machines has to be taken into account.

If there be two machines—one weighing 500 lbs. with an L/D ratio of 10/1 at cruising speed, and the other weighing 750 lbs. with an L/D of 15, both will require 50 lbs. thrust at cruising speed. Assuming this speed in both cases to be the same, both will cruise using the same h.p. and if both carry one man only, both will carry the same useful load per h.p.

But with the same available h.p., both would have the same initial thrust for accelerating from rest, and the lighter machine will therefore "get off" quicker. Also both will have approximately the same margin of power available for climbing, and the lighter machine will therefore climb at about 1½ times the rate of the heavy machine.

This point is important, because without a quick get-off and a reasonably steep initial climb a machine of the type in question will need an aerodrome as large as that needed for the ordinary heavy commercial type of aeroplane to take off with safety. If low-powered machines are to be of any continued value and interest they must be able to climb out of quite small fields.

The requisite qualities of the low-powered aeroplane are then that it should be :—(1) Slow; (2) clean; (3) light.

THE GENERAL REQUIREMENTS.

The need for slow speed as a matter of fact, is one of low minimum speed.

The minimum of h.p. for level flight does not occur at the actual stalling speed of an aeroplane—but is usually closely in that neighbourhood. It is a low minimum h.p. that is required for this type of machine, and, as at low speeds of flight the resistance of the body of an aeroplane is small, the question of obtaining a low minimum h.p. resolves itself into the attainment of a low-landing speed—provided that in the process the weight of the machine is not unduly increased. A low-landing speed is practically a question of wing-loading, and wing-loading is reduced by reducing weight, or by increasing area.

Unfortunately increasing area means increasing wing weights. One can, by building a biplane, or a braced monoplane, instead of a cantilever monoplane, increase the surface, without increasing weight and so reduce landing speed.

This almost certainly means increased body resistance—which will have its effect particularly on top speed, and in this matter it has to be remembered that there are practical limits to the reduction in loading that is possible.

For various reasons it would appear unprofitable to put the loading much below 2½ lbs. per sq. ft. which is compatible with a landing speed of about 24 m.p.h., and this loading can be achieved for machines of the type in question, with a cantilever monoplane construction. The advantages of low resistance—giving a relatively high top speed—and generally simple and sturdy construction can then be achieved.

WINGS AND BODY RESISTANCE.

The value of low resistance is obvious. At very low speeds the resistances of such items as body, wheels, pilot's head, etc., are small in magnitude, compared to that of the wings. There is no very vast difference between the L/D ratio of the majority of standard wing sections at stalling speed—but the thicker type of wing sections suitable for cantilever construction seem to have definite advantages at high lift coefficients.

As the effect of high aspect ratio in reducing wing resistance is particularly marked at high lift coefficients the highest possible aspect ratio should be used to keep down the power needed at low speeds.

As already mentioned, the requirement of low weight is somewhat at variance with the need for a low-landing speed. It is also at variance with the other aerodynamical requirements.

The lightest wing structure should theoretically be that of the least possible span, and of the maximum depth of girder. This would call for a multiplane construction—which by no means lends itself to simplicity or cheapness of construction, or to the high aerodynamic efficiency which is required.

A cantilever monoplane of high aspect ratio will pretty certainly be heavier than any braced wing machine of the same landing speed, but it will also pretty certainly have a lower L/D ratio over its whole flying range, and the problem is to secure the compromise which needs the lowest thrust h.p.

Fortunately the problem in this case is simplified by the fact that within limits the structure weight of the aeroplane itself is of fairly small importance. The machine must carry pilot, engine and fuel—and these weights form a very large proportion of the total. Nature has made man to a fairly uniform weight—and for small engines of the size in question the weight of essential accessories is so great that the total weight of power plant does not decrease in proportion to the power.

(To be continued.)

THE GNOSSPELIUS LIGHT AEROPLANE.

Major O. T. Gnosspelius, who was among the earliest pioneers of seaplane construction not only in England but in the World, has for long been convinced that the ordinary aeroplane of to-day is an unnecessarily wasteful and uneconomical affair.

Although this opinion is and has been shared by a number of other persons, Major Gnosspelius, unlike the majority of those holding this opinion, has taken active steps towards the practical improvement of aeroplanes.

Some few months back THE AEROPLANE reported a paper read before the Institution of Aeronautical Engineers in which Major Gnosspelius described the simple and ingenious pendulum arrangement which he had devised for testing aeroplane models without a wind-channel.

With this apparatus he carried out many tests on wing models. These tests generally speaking confirmed the results obtained on similar models with more orthodox test methods, but led to the conclusion that even in the matter of wing sections much remained to be learnt.

But it was felt that tests of wing models alone did not really serve the purpose which was in view, that of making more efficient aeroplanes, and therefore tests of more or less complete models of machines and gliders were put in hand.

Like many others Major Gnosspelius has always believed—despite wind-tunnel tests on Alsatian Swifts—that the average bird was a vastly more efficient glider than the normal man-made aeroplane, and so one of his very early tests in this direction was of a model which roughly followed the lines of a bird.

The results were extremely promising, although one or two somewhat unexpected difficulties were met with—more particularly in regard to the effect of fitting tail surfaces.

These difficulties were in time overcome, and models of bird-like form, complete with pilot's head, landing wheels and tails were produced which showed a maximum ratio of lift to drag of 18/1 and over—as compared to an L/D ratio of 9 or so for the average modern biplane.

A result so far outside of previous experience might naturally give rise to doubt as to the reliability of the method by which the result was obtained—and Major Gnosspelius decided that he would check the model results by building an aeroplane of this type, and some months ago long before any prizes for low-powered machines were on offer in this country he decided to construct a motor-cycle engined single-seater of this type for test purposes.

This machine, which is now nearing completion, is being built for Major Gnosspelius at the works of Short Bros. at Rochester.

The machine is a cantilever monoplane, of 36 ft. span, with a boat-built body of circular section.

The wings are of a heavily-tapered plan form—a feature giving a high aspect ratio with the minimum of structural difficulties, and are of quite thin section.

The pilot is seated with his head let into the leading edge of the centre section, which is attached to the top of the fuselage. Behind his head is a streamlined petrol tank and behind that again is the engine—a 60° Vee twin "Blackburne" motor-cycle engine of 698 c.c. cylinder capacity.

The engine drives by chains two pusher-airscrews each of 4 ft. 0 in. diameter carried on shafts supported on top of the wing spars.

The undercarriage consists of a pair of Palmer aeroplane wheels (300 m/m. × 60 m/m.) carried on an axle inside the fuselage, so that only about 1/3 the wheel diameter protrudes through the fuselage. The axle is sprung on ordinary rubber shock-absorbers in horn plates.

There is no tail-skid—its place is taken by a duralumin rubbing strake fitted under the belly of the fuselage behind the wheels.

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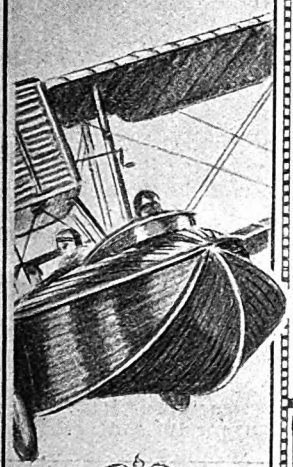

The above illustration shows a Vickers "Vanguard" (23 Passenger) Aeroplane fitted with two Napier "Lion" Engines.

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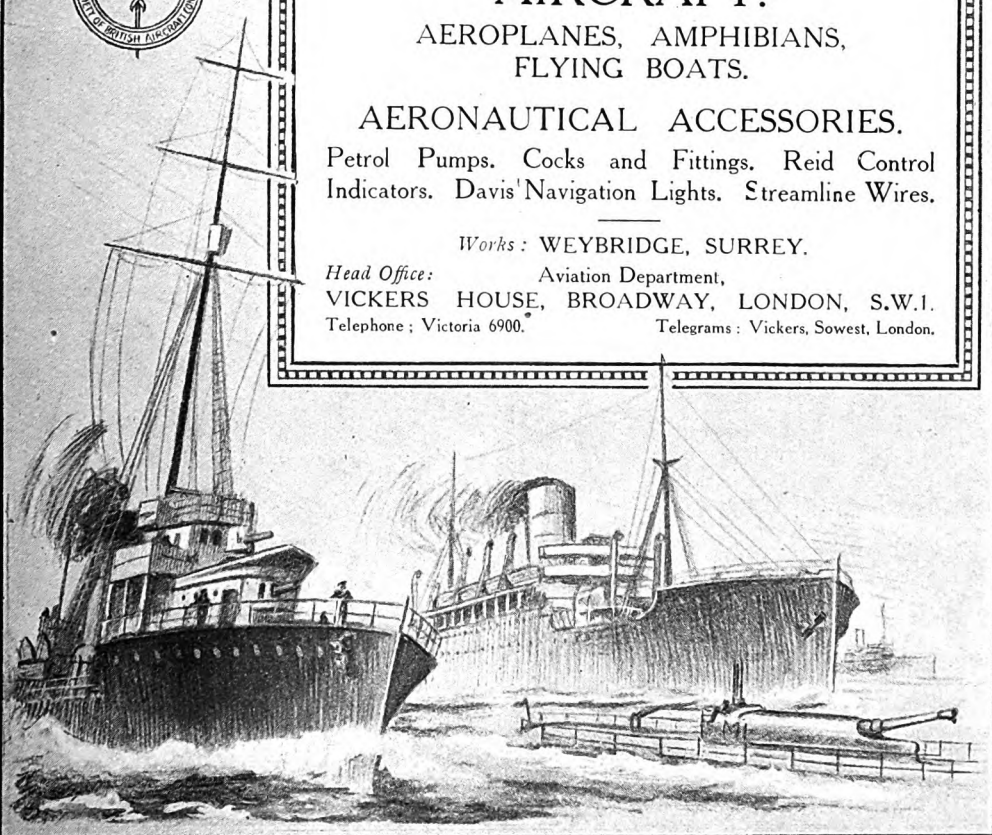

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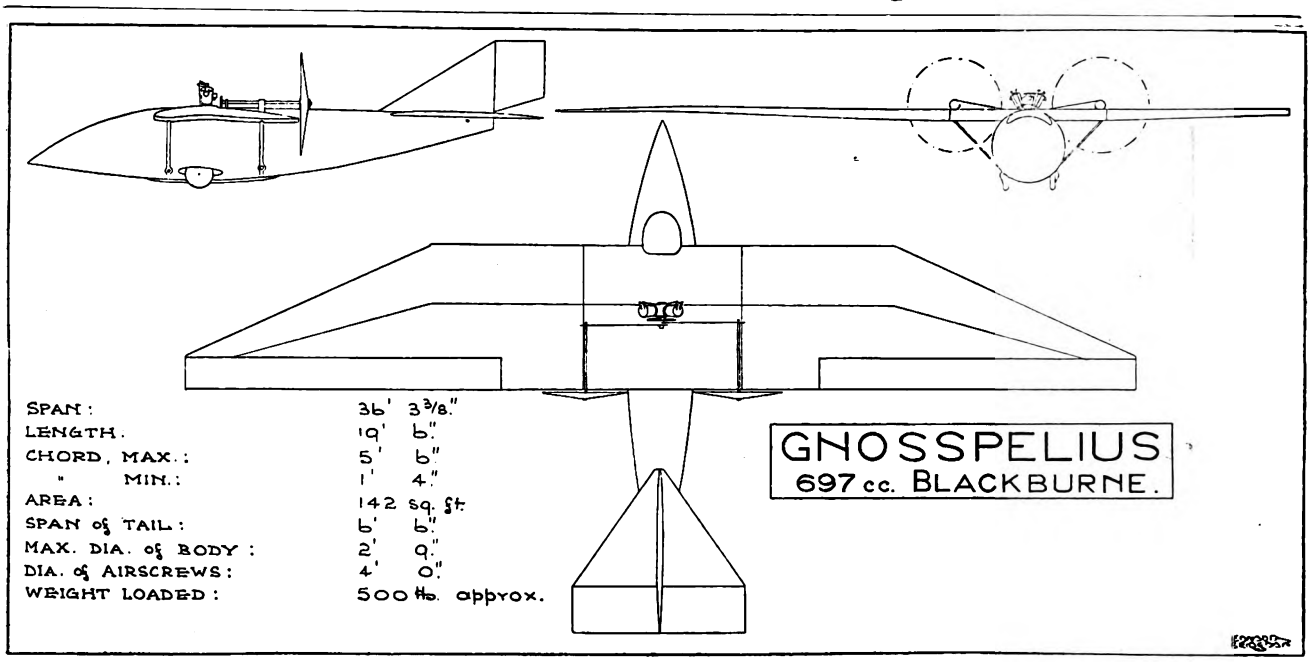

SPAN: 36' 3 3/8"
LENGTH. 19' 6"
CHORD, MAX.: 5' 6"
" MIN.: 1' 4"
AREA: 142 sq. ft.
SPAN of TAIL: 6' 6"
MAX. DIA. of BODY: 2' 9"
DIA. of AIRSCREWS: 4' 0"
WEIGHT LOADED: 500 lbs. approx.
GNOSSPELIUS
697 cc. BLACKBURNE.

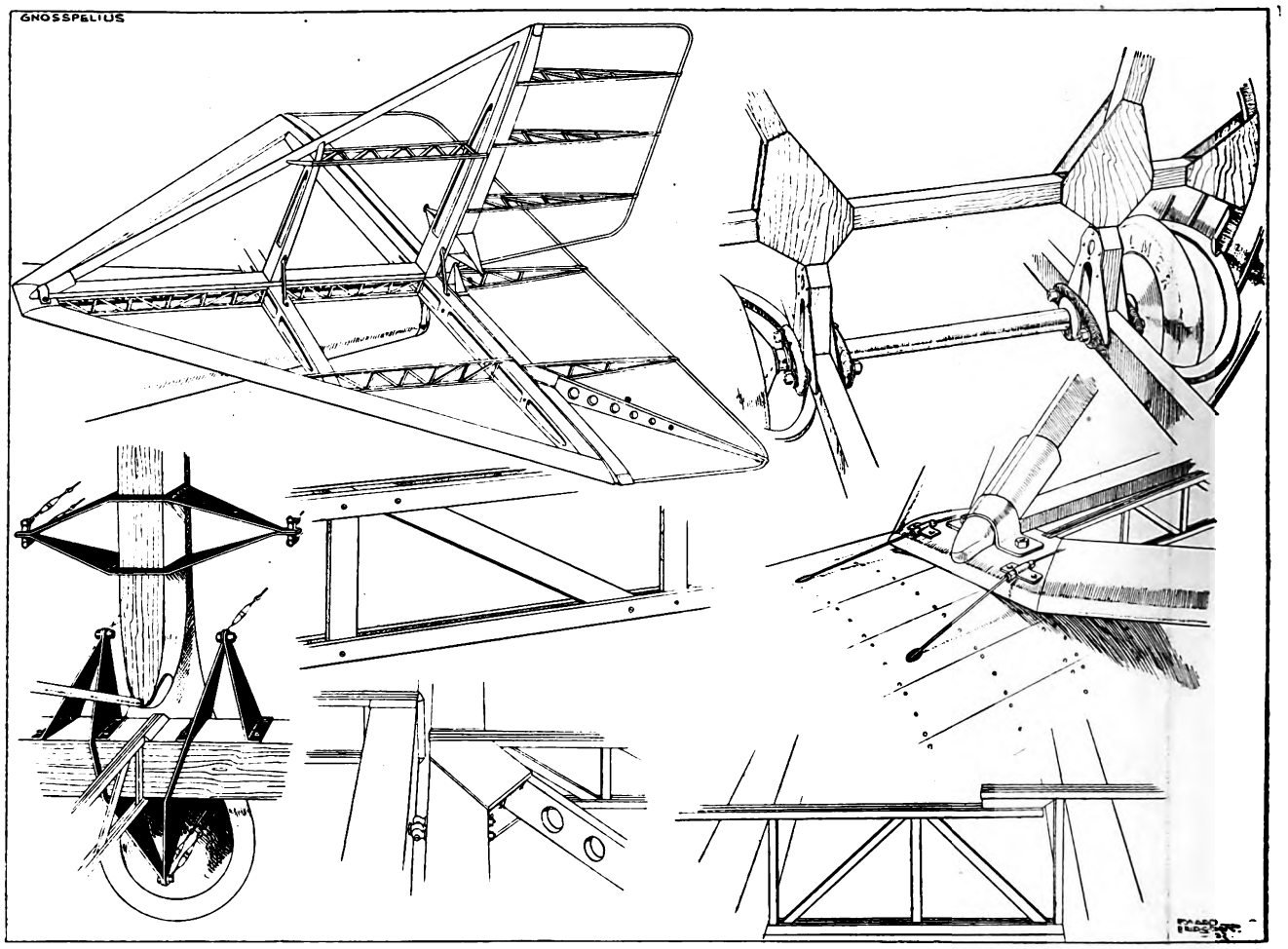
The wings are in three portions—a centre section of about 7 ft. 0 in. span, and two extension planes. They are built on four main spars all of box section with spruce top and bottom members and three-ply sides. The ribs are spruce lattice girders, glued and nailed together, and piano-wire drag bracing is fitted. Three-ply stiffening is fitted between the leading edge and the front spar.

The front and rear spar of the centre section are braced to the bottom of the centre section by a pair of oval steel tube struts on each side.

The extension wings are attached to the centre section by vertical cottar-pins which pass vertically through fish-plates on the top and bottom of the extension spars and through box fittings on the centre section. Tapered faces on these pins pull the spar roots tight against the abutting faces on the centre section.

A remarkable feature of the wing is the fact that it is fitted with a step of about $\frac{3}{8}$ in. deep on the upper surface just behind the front spar. This step has been found by experiment on models to improve the efficiency of the wing.

The fuselage, as already mentioned, is boat built. The main body is built of light elm hoops planked with spruce of about $\frac{1}{16}$ in. thickness. This structure is internally reinforced over its front half by a framework of spruce longerons and struts,



DETAILS OF THE GNOSSPELIUS MONOPLANE.—Top left the tail unit in skeleton. Right, the landing gear inside the fuselage. Bottom left, the arrangement of control levers on the tail. Alongside, the rib girder construction and a tail hinge detail. Bottom right, the curious "step" in the wing. Above this is the attachment of the tail plane to the fuselage. By the irreverent this machine is known as the "Gnosspelicopter."

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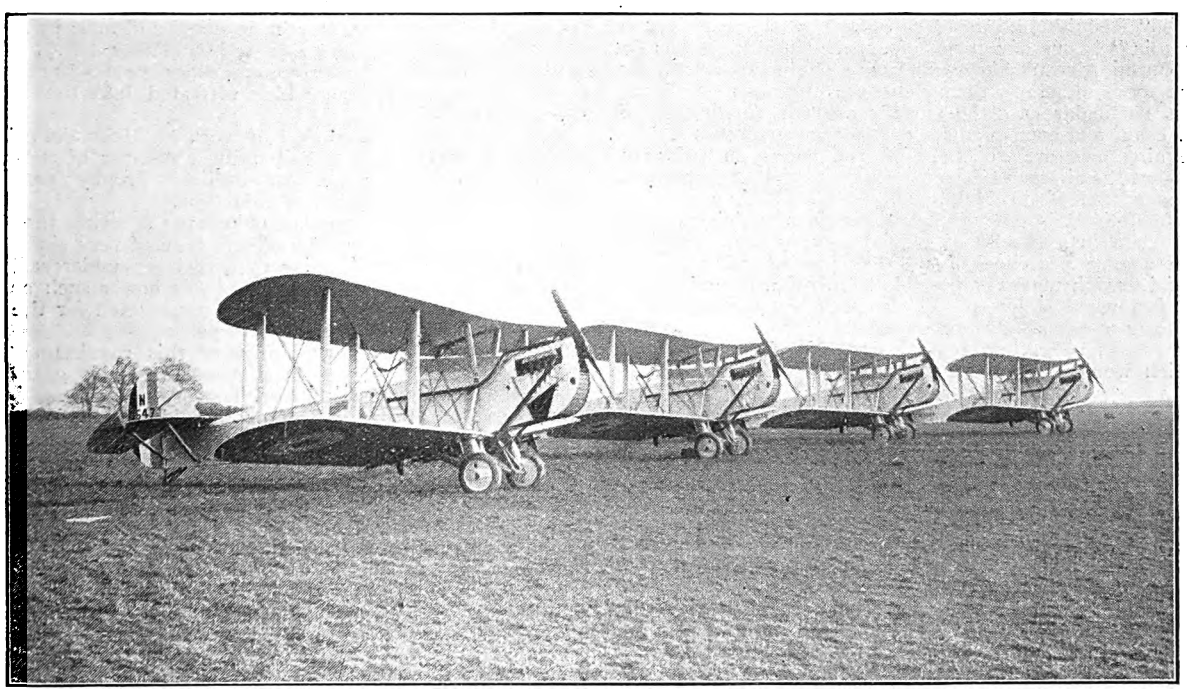

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OLYMPIA, LEEDS.

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with some wire bracing, to take the controls, pilot's seat, landing axle, and wing attachments.

The tail unit consists of a triangular fixed tail plane, and a triangular fin followed respectively by a rectangular elevator and a nearly rectangular rudder. The whole tail is mounted on top of the fuselage, and the after end of the fuselage is swept up so that the whole tail is above the chord line of the wing.

A number of details of the construction of this machine are shown in sketches.

The total weight loaded will be between 450 and 500 lbs. The wing area is about 160 sq. ft., giving a loading of approximately 3 lbs. per sq. ft.

From the model tests a top speed of at least 70 m.p.h. and a climb of some 400-500 ft.per minute is confidently expected, and there is very good reason to hope that the real performance will be considerably better than this.

The engine, which, as already mentioned, is a Blackburne, is a standard nominal 6/8 h.p. overhead valve motor-cycle engine without special lightening or tuning-up. The bore and stroke are 71 mm. × 88 mm. Engine and fly-wheel weigh 66 lbs., or with magneto, about 73 lbs. The power curve of the engine shows that it develops about 24 B.H.P. at 4,500 r.p.m., and 20 B.H.P. at 3,250 r.p.m.

The airscrews are driven through a chain reduction gear of about 2/3 ratio, and are designed to run at about 2,200 r.p.m. (3,300 r.p.m. on engine) in the air.

Preliminary tests of the engine and airscrew drive have been made on a "mock up" of the centre section to which the unit will eventually be attached. Although the engine is not even fitted with aluminium pistons, the installation runs quite satisfactorily, and there is no vibration of a serious nature.

NEW AEROPLANES IN THE PRESS.

(A) The generality of the Daily Press on Friday May 4 were somewhat excited over the apparition in the streets of Norwich of a large all-steel machine built by Boulton and Paul Ltd. This machine which is of the class generally described as "Postal" and is now known by the type name of "Bodmin" is one of a series of experimental machines on order for the Air Ministry which are equipped with gear drives to more airscrews than there are engines.

In this particular case the engines are two in number of 450 h.p. each, and each of them drives two airscrews.

These airscrews are arranged on the wings in pairs in tandem—but the airscrews driven by each engine are arranged one on each side of the body.

The "Bodmin" is one of those machines which the Air Ministry veils in a shroud of official secrecy and therefore only the chance presence of a Press photographer in the streets of Norwich makes it possible to mention its existence. It is in fact what Major W. E. de B. Whittaker calls "a secret known to everybody but ourselves."

So far as can be gathered the machine is distinctly of the type which would please the heart of Brig.-Gen. R. P. C. Groves.

(B) The *Daily Telegraph's* aeronautical correspondent of the same date (May 4) waxes almost lyrical over "a novel solution of the difficulties" of making flying boats seaworthy, without however any indiscreet disclosure as to the particular method in question.

It is however fairly certain that this paragraph refers to Mr. W. O. Manning's new experimental seaplane—guarded references to which have been made in this paper recently. Permission to publish some reference to this design is incessantly expected, and will doubtless be received after the representatives of all foreign Powers have obtained full information as to the technical details of the machine.

THE INSTITUTION OF AERONAUTICAL ENGINEERS.

On Friday evening, May 11, the Institution of Aeronautical Engineers will hold the final meeting of the Current Session, at the Engineers' Club, Coventry Street, at 6.30 p.m.

At this meeting, Major M. E. A. Wright, A.F.C., will give a lecture on "Low-power Flying." Mr. W. O. Manning will occupy the Chair.

It will be remembered that Major Wright in addition to a very long experience of test-piloting on normal machines was a very early glider, and has made the preliminary flying tests on the A.B.C.-engined "Wren," designed by Mr. Manning.

The paper should be of great interest in view of the large amount of attention now being given to this low-powered aeroplane, and it is to be remembered that Major Wright is the only British pilot who has actually flown a machine of this type.

All who are interested in the subject are invited to attend.

MINUTES OF THE I.AE.E.

No. 4 of the Minutes of Proceedings of the Institution of Aeronautical Engineers has just been published.

This number contains a paper, in three sections, by Mr. C. W. Tinson on the Constructional Design of Aeroplanes, which is of an eminently practical nature, and one on Oleo-Undercarriage Design, by Mr. G. H. Dowty.

Both papers contain a large amount of useful information which should be valuable to students of aeronautics and even to experienced designers.

The "Minutes" can be purchased by non-members at the Institution for 2s. 6d. per number, and can be obtained from the Secretary, the Institution of Aeronautical Engineers, 60, Chancery Lane, W.C.2.

A NEW AIR LINE.

On Apr. 15 the Danske Luftfartselskab A.S. were to open a daily air service from Copenhagen to Hamburg.

The Danish Government has granted the company, which has been in existence since the spring of 1918, a subsidy of 110,000 kroners. The service, it is estimated, will save 2½ hours in the journey from Copenhagen to nearly all the principal cities of Europe served by air-lines. Departure from Copenhagen will be at 16.00 o'clock arriving at Hamburg at 18.00 o'clock. From there passengers and [illegible] be transferred to the night trains to Cologne or [illegible] from those cities connections can be made to [illegible] Brussels, Paris, Munich, Prague, Vienna, Spain, [illegible] Baltic States and Russia.

In the return direction, the night train from [illegible] Berlin arrives at Hamburg at roughly 08.00 o'clock, [illegible] Copenhagen machine leaving at 09.00 o'clock, and [illegible] Copenhagen at 11.00 o'clock.

The fare from Hamburg to Copenhagen or vice-versa [illegible] be 80 kroners (£2 13s. 4d.) per passenger with a free [illegible] ance of 15 kg. of personal luggage. Goods and [illegible] luggage will be charged at 1.5 kroners or roughly 1[illegible]

RETRACTABLE UNDERCARRIAGE

Mr. James V. Martin who was well known as [illegible] all habitués of Hendon in its earliest days has for many [illegible] been engaged in the development of various [illegible] connected with the design of aeroplanes.

Among the developments with which he has been [illegible] concerned is that of the retractable undercarriage. [illegible] the end of the War Mr. Martin designed and built in [illegible] a little single-seat biplane with a two-cylinder A.B.C. [illegible] engine of 35 h.p. which among other novel features embodied an undercarriage which retreated into the fuselage when in the air.

Since that date a good deal of work has been done in this connection in the U.S.A. and quite a number of the racing machines entered for the last Pulitzer Trophy race were fitted with undercarriages of this type.

Mr. Martin holds a number of patents covering the design of undercarriages of the retractable type of very simple construction, and it is his view that such an undercarriage is especially suitable for aeroplanes of low power such as those which are now being designed and constructed for the Duke of Sutherland's and other similar prizes.

To encourage the development of this requirement, Mr. Martin offers, through THE AEROPLANE, to grant free licences to use his patents Nos. 125,591, 135,213, 140,137 and 175,706 to any or every firm or individual who enters and flies in the forthcoming low-powered aeroplane competitions a machine fitted with a retractable undercarriage. This licence shall be non-revocable, but is to be limited to machines not exceeding the weight of the machine actually entered for these contests.

The necessary mechanical details for a light-weight machine can obviously be very simple, and an undercarriage of this type will certainly allow one to overcome the difficulty of obtaining in such a machine the minimum possible size of body with the requisite ground clearance for the airscrew.

Designers or constructors who desire to make use of Mr. Martin's offer should communicate with the Editor of THE AEROPLANE.

AN ENDURING WHITE METAL.

The big-end bearing of a high-powered radial engine is subjected not only to the loads due to cylinder impulses, but to inertia loads caused by the acceleration of all the connecting rods and pistons which are coupled to it.

These inertia loads are in general very considerably greater than those due to the explosion pressures, and in fact the big-ends of this type of engine have led to a greater amount of trouble and to a larger number of failures than any other detail or component.

It is therefore a very great testimonial to the enduring qualities of Hoyt bearing metals to learn that the big-end bearing of the Bristol "Jupiter" which has recently made a run of 150 hours under A.I.D. inspection, was lined with Hoyt "Number Eleven" Babbit metal.

This particular alloy has a long record of successful work under the most trying conditions—and has been especially satisfactory for aero-engine bearings. During the war the "Number Eleven" was used in Hispano-Suiza engines alone to the extent of over 250 tons in France and over 380 tons for the whole of the Allied countries.

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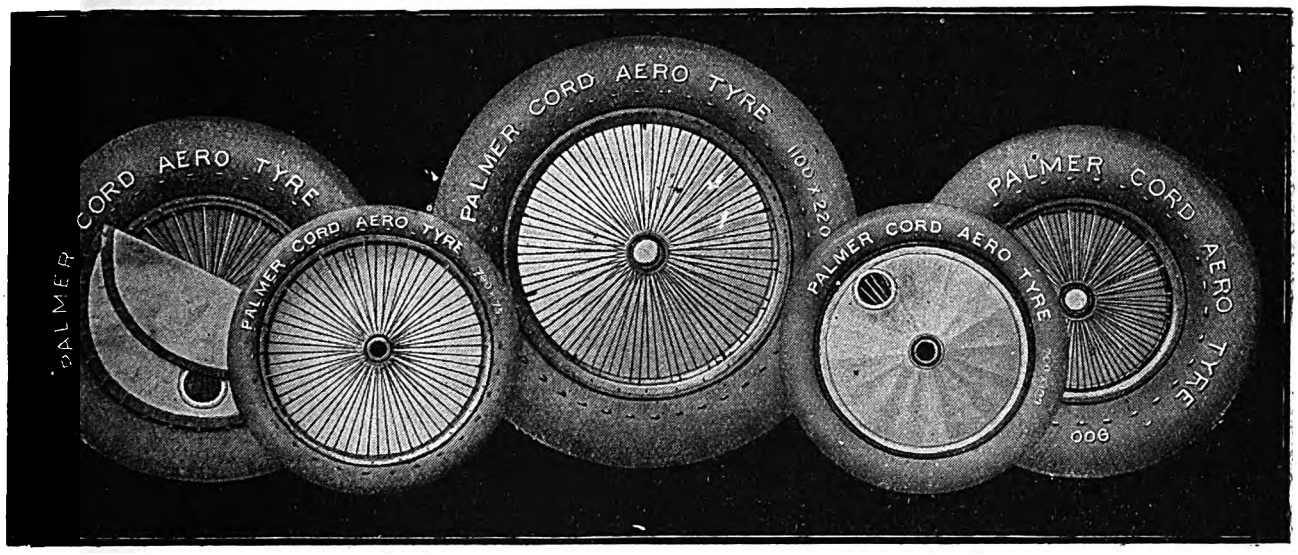
PALMER

LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	96	178.	55.	132/46	1000×150	209	185.	55.	Central
,,	17	72.39	12.7	Central	,,	99	178.	38.89	132/46	,,	210	185.	60.32	Central
					,,	112	150.	38.09	Central	1000×180	148	220.	80.	Central
450×60	30	89.	31.75	Central	650×125	119	178.	55.	132/46	,,	149	185.	55.	Central
,,	138	130.	38.09	Central	750×125	77	178.	44.45	132/46	,,	155	220.	66.67	Central
575×60	21	160.	28.	Central	,,	92	185.	55.	135/50	900×200	107	185.	55.	Central
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	108	185.	55.	125/60
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	128	220.	66.67	Central
					,,	99	178.	38.89	132/46	,,	137	250.	80.	Central
600×75	21	160.	28.	Central	,,	112	150.	38.09	Central	,,	202	185.	60.32	Central
,,	34	150.	31.75	104/46	800×150	82	185.	55.	135/50					
,,	111	150.	38.09	104/46	,,	85	185.	55.	Central	1100×220	134	220.	66.67	Central
					,,	36*	185.	55.	135/50	,,	136	250.	80.	Central
700×75	78	178.	44.45	132/46	,,	40*	185.	60.32	135/50					
,,	79	178.	44.45	Central	,,	152	185.	66.67	135/50	1250×250	133	250.	80.	Central
,,	100	178.	38.09	132/46	,,	163*	185.	66.67	135/50	,,	154	304.8	101.6	Central
,,	101	178.	31.75	132/46	1000×150	131	220.	66.67	Central					
					,,	102	185.	55.	125/60	1500×300	115	304.8	101.6	Central
700×100	77	178.	44.45	132/46	,,	141	250.	80.	Central	,,	126	304.8	152.4	Central
,,	92	185.	55.	135/50	,,	201	185.	60.32	125/60	1750×300	139	400.	152.4	Central
,,	95	185.	55.	Central										

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R.A.F. INTELLIGENCE

Appointments.

AIR MINISTRY, week ending May 8.

GENERAL DUTIES BRANCH.—Wing/Cmdr. J. H. S. Tyssen, M.C., to No. 5 Wing H.Q., Biggin Hill, 30/4, to command.

S/Ldrs. W. R. Read, M.C., D.F.C., A.F.C., to No. 1 School of T.T. (Boys), Halton, 1/5; R. P. Whitehead, to No. 27 Sqdn., India, 15/3; F. P. Don, to H.Q., Iraq Command, 11/4.

F/Lts. A. S. Maskell, to Air Ministry, 14/5; V. Buxton, O.B.E., to No. 1 F.T.S., Netheravon, 14/5, for course of instruction; K. H. Riversdale-Elliot, to H.Q., Iraq Command, 8/3; G. H. Cock, M.C., to No. 8 Sqdn., Iraq, 23/2, instead of to No. 84 Sqdn., Iraq, as previously notified; N. Keeble, D.S.C., D.F.C., to No. 30 Sqdn., Iraq, 23/2, instead of to H.Q., Iraq Command, as previously notified; C. B. Dick-Cleland, to Station Commandant, Iraq, 23/2, instead of to No. 30 Sqdn., Iraq, as previously notified; A. L. Chick, A.F.C., to H.Q., Iraq Command, 16/9; L. G. Paget, A.F.C., to No. 45 Sqdn., Iraq, 23/2, instead of to No. 55 Sqdn., as previously notified; D Craik, D.F.C., to No. 5 F.T.S., Shotwick, 1/5.

F/Os. E. J. Protheroe, to R.A.F. Base, Gosport, 7/5; J. G. Murray, to R.A.F. Depot, 28/4; M. W. Nolan, to No. 20 Sqdn., India, 15/4; R. W. H. Cook, to No. 20 Sqdn., India, 5/4; W. G. Nicholls, to No. 60 Sqdn., India, 15/4; C. A. Mason and G. C. Sclater, to No. 27 Sqdn., India, 23/2, instead of to Aircraft Depot, India, as previously notified; (Hon. F/Lt.) A. J. Carlielle, to Aircraft Depot, India, 14/3, instead of to No. 20 Sqdn., India, as previously notified; S. H. Cooper, to No. 20 Sqdn., India, 23/2, instead of to Aircraft Depot, India, as previously notified; H. N. Hampton, D.F.C., to H.Q., Iraq Command, 1/8; E. L. Barrington, M.C., D.F.C., to No. 1 Sqdn., Iraq, 23/1; J. A. McLaren, M.C., to H.Q., Iraq Command, 23/2, instead of to Stores Depot, Iraq, as previously notified; G. H. Vasse, to No. 6 Sqdn., Iraq, 3/4; G. A. Hadley, to No. 39 Sqdn., Spittlegate, 15/5.

P/Os. J. J. Comerford, C. B. Horsfield, C. B. Greet, G. W. Dean, B. V. Reynolds, and T. A. Verney-Cave, all to R.A.F. Depot, 16/4, pending disposal; J. V. Holman, to No. 2 Sqdn., Sth. Farnborough, 1/5; T. J. Desmond, to No. 4 F.T.S., Egypt, 3/3.

MEDICAL BRANCH.—F/Lts. (Medical) W. G. L. Wambeck, to R.A.F. Depot, 26/3, on transfer to Home Establishment; T. Sheehan and K. R. Smith, M.D., D.P.H., to Research Laboratory and M.O. S. of I., Hampstead, 25/4; H. H. R. Bayley, to Research Laboratory and M.O. S. of I., Hampstead, 27/4.

STORES AND ACCOUNTANTS BRANCH.—F/Os. (Stores) A. G. Knight, M.B., to No. 27 Sqdn., India, 23/2, instead of to Aircraft Depot, India, as previously notified; G. W. Sturman, to Aircraft Depot, India, 1/4; J. G. Smithson to R.A.F. Base, Gosport, 15/5.

F/Os. (Accountants) A. L. Palmer, to No. 41 Sqdn., Northolt, 23/4, N E. D. Hutchinson, to No. 32 Sqdn., Kenley, 7/5; J. J. T. Rose, to School of Balloon Training, Larkhill, 15/5.

S/Ldr. (Accountant) J. L. Robertson, to No. 1 S.D., Kidbrooke, 27/4.

CHAPLAIN'S BRANCH.—Rev. J. R. Walkey, M.A., to Aircraft Depot, Iraq, 1/3.

From *The London Gazette*, May 1.

ROYAL AIR FORCE.—Air/Cmdre. F. C. Halahan, C.M.G., D.S.O., M.V.O., relinquishes the appointment of Director of Aeronautical Inspection, Air Ministry, Apr. 1.

GENERAL DUTIES BRANCH.—The following are granted short service commns. as F/Os. for five years on the active list, with effect from, and with seniority of, the dates indicated: F. E W Davis, Apr. 18; G W. Higgs, Apr. 16; A. A. N. D. Pentland, M.C., D.F.C., Apr. 23.

The following promotions are made:—F/O to be Hon. F/Lt.: J E. Catherall, M.B.E. (Capt. R. Warwicks Regt.), Jan. 1. P/Os. to be F/Os.: D. R. Sharman, M.C. (April 1); B. J. J. Nimmo, Apr. 29. F/Lt A. W. Symington, M.C., remains on half-pay, Scale A, for a further period of three months, Apr 1

The following are placed on half-pay, Scale B:—F/Lt. H. H. Balfour, M.C., Apr. 25; Observer/O. J. Bowen, Apr. 19.

PROMOTIONS.—The following promotions are made:—

GENERAL DUTIES BRANCH (SUPPLEMENTARY LIST).—F/Lt. to be S/Ldr.: R. Hutton, Jan. 1.

STORES BRANCH (SUPPLEMENTARY LIST).—F/Lt. to be S/Ldr.: J. C. E. Gillham, Jan. 1. F/Os. to be F/Lts.: F R. Berresford, A. J. Roberts, T. S. James, W. A. O. Honey, Jan. 1; A E. M. Dredge, M.B.E., F. S. Moore, Jan. 27.

The R.A.F. Pageant.

The Air Ministry announces:—

The R.A.F. Pageant, which was instituted in 1920, will take place on June 30, at the London Aerodrome, Hendon, It is hoped that H.M. the King, Chief of the R.A.F., will be present.

This annual review of the flying units is an integral and important part of the annual training of the R.A.F.

The Pageant enables representatives to be brought together of the different types of squadrons which carry out the work of the R.A.F., such as aerial fighting, bombing, reconnaissance and the like and of giving them practice in association with one another. This enhances its value from the training point of view, while a valuable stimulus to keenness and efficiency is provided by the inter-unit competitions and displays; in addition it enables the general public to have an opportunity on the one hand of observing developments both on the flying and technical sides and on the other of obtaining a first-hand knowledge of the work and efficiency of its aerial defenders which would otherwise be difficult, owing to the necessity of having R.A.F. squadrons and units stationed in localities at a distance from the centres of population.

A programme has been arranged which will fully equal in interest that submitted in previous years, special attention being devoted to the presentation of demonstrations of the most scientific methods in aerial attack and defence, and to a display of aircraft of the latest types for co-operation with the Navy and the Army, and for independent Air Force activities.

As in the case of the Royal Tournament all the proceeds are devoted to Service charities.

The High Commissioner for Iraq.

A farewell banquet was given on Apr. 26 at Baghdad to Sir Percy Cox, the High Commissioner for Iraq, which was attended by the Iraq Ministers, officers of the R.A.F., and representatives of commercial firms.

Sir Henry Dobbs in a speech said that for 15 years Sir Percy Cox had been a great rock for British interests and had shouldered appalling responsibilities. The foundation of the Kingdom of Iraq was one of Sir Percy Cox's greatest achievements.

A tribute was also paid to Sir Percy Cox by Air Vice-Marshal Sir J. M. Salmond, Air Officer Commanding in Iraq.

Replying, the High Commissioner said that no doubt the British would stay in Iraq for many years until Iraq could stand alone with ultimate independence Peace with Turkey was essential.

The Silent Service.

The following extracts are from the *Times* of May 1 and May 2:—

"Navy Officer at Air College.—Commander E K. Boddam-Whetham, D.S.O., the senior of the naval officers who have qualified for observer duties and have recently been serving on board the 'Queen Elizabeth,' yesterday began a course at the Air Force Staff College at Andover. Before his promotion in 1920 this officer commanded the destroyer 'Swallow' and other torpedo craft. He was awarded the D.S.O. for the manner in which he handled his ship in action with enemy destroyers off the Belgian coast in June, 1917, in the face of superior forces and under the fire of the shore batteries. It was in July last that he was selected for training as an air observer and appointed to the aircraft-carrier 'Argus.'

"New Captain of H.M.S. 'Eagle.'—Capt. G. O. Stephenson, C.M.G., who in February was appointed to the new aircraft-carrier 'Eagle,' which is undergoing alterations at Portsmouth, has been nominated as Flag-Captain and Chief Staff Officer to Rear-Admiral W. A. Howard Kelly, C.B., C.M.G., M.V.O., who hoists his flag in the battleship 'Revenge' to-morrow. Accordingly a new commanding officer joins the 'Eagle' to-day in the person of Capt. L. G. Preston, C.B., recently undergoing the Senior Officers' Technical Course. Capt. Preston, as a commander, was in command of the minesweeping gunboats of the Grand Fleet when war broke out, and was promoted in December, 1914. The wholesale use of mines by the Germans greatly increased the extent and responsibility of his work and he eventually became Director of Minesweeping at the Admiralty, where he served until October, 1919. He was awarded the C.B. for his valuable services in helping to cope with the mine menace. In 1919-20 he commanded the 'Patrol,' Minesweeping and Fishery Protection Flotilla, and in 1920-22 was in charge of the Signal School at Portsmouth."

The Staff College, Quetta.

The list of officers who have recently graduated at the Staff College, Quetta, includes Major L. V. S. Blacker, O.B.E., 3/12 Frontier Force Regt. (Sikhs)—Major Blacker was an officer of the R.F.C. during the war and is the author of that remarkable book "On Secret Patrol in High Asia."

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

Stores Depot, Egypt.

ATHLETIC SPORTS MEETING, ABOUKIR, MAR. 22.

Cross Country Race:—(Distance 7½ miles approx.) Winner Cpl. Clark, A.D., (2) French, A.D., (3) Price, A.D., (4) Luck, A.D., (5) Weatherstone, S.D., (6) Pearce, A.D., (7) Chaffey, S.D., (8) Knight, A.D., (9) Taylor, S.D., (10) Barclay, A.D.

100 Yards R.A.F.:—(1) Meddings, S.D., (2) Lewis, S.D., (3) Bovington, S.D. 100 Yards Open:—(1) F/Lt. Windsor (4 F.T.S.), (2) Smith (E.R.D.), (3) Pte. Haynes (Hants. Rgt.). 100 Yards Officers:—(1) Organ, S.D., (2) F/O. Starley, A.D., (3) F/O. Litton, A.D. 440 Yards R.A.F.:—(1) Lewis, S.D., (2) Bovington, S.D., (3) Stainsby, A.D. 440 Yards Open:—(1) Holmes (Hants Rgt.), (2) Hopegood (4 F.T.S.), (3) F/Lt. Windsor (4 F.T.S.). 120 Yards Hurdles:—(1) Field, A.D., (2) Major, S.D., (3) Green, S.D. Half-Mile R.A.F.:—(1) Owen, A.D., (2) Clark, A.D., (3) Thornby, S.D. One Mile R.A.F.:—(1) Cpl. Clark, A.D., (2) Luck, A.D., (3) Howell, S.D. One Mile Open:—(1) Vincent (4 F.T.S.), (2) Haynes (Hants Rgt.), (3) Hopegood

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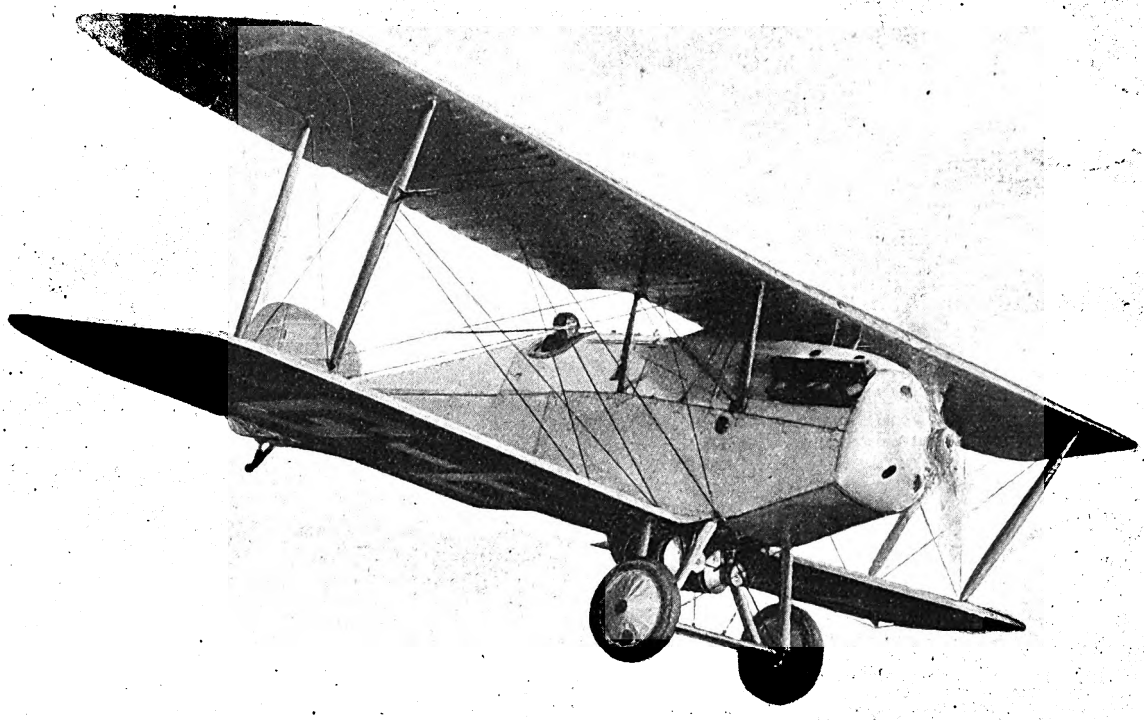
An A.D.C. Martinsyde F4.



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(4 F.T.S.) Three Miles R.A.F. :—(1) Price, A.D., (2) French, A.D., (3) Corney, A.D.

High Jump R.A.F. :—(1) Hall, A.D., (2) Campbell, A.D., (3) Courtney, S.D. Long Jump :—(1) Field, A.D., (2) Armstrong, S.D.

Tug-of-War R.A.F. :—Winners, Aircraft Depot. Tug-of-War Open :—Winners, Royal Marines, H.M.S. *Ajax*.

1½ Miles Team Race :—Winning Team, Aircraft Depot. Team : Cpl. Clark, Pearce, French, Knight and Price. Relay Race :—Winning Team, Stores Depot. Team : Thornby, Lewis, Bovington and Meddings.

Throwing the Cricket Ball :—(1) Hodges, A.D., (2) Wyatt, A.D., (3) Reeder, S.D. Putting the Weight :—(1) Brooker, S.D., (2) Nicholson, A.D. Throwing the Hammer :—(1) SM. Walls, A.D., (2) AC. Brooker, S.D., (3) AC. Nicholson, A.D.

Donkey Race :—(1) Courtney, S.D., (2) Coleman, A.D. Band Race :—(1) AC. Filmer, A.D., (2) AC. Queen, A.D., (3) L/AC. Davies, A.D. Sack Race :—(1) Courtney, S.D., (2) Wakely, S.D. Three-Legged Race :—Winners Bovington and Green, S.D., (2) Lewis and Meddings, S.D.

Veterans Race :—(1) SM. Walls, A.D., (2) Cpl. Draper, S.D., (3) SM. Frankin, S.D. Obstacle Race :—(1) Courtney, S.D., (2) Hydes, A.D., (3) Walker, S.D. Boat Race :—Winners, Stores Depot. (Cox.), Cpl. Draper. Tilting the Bucket :—Winners Howard and Morris, A.D., (2) Hanot and Nichols, A.D. Greasy Pole :—Winner, Courtney, S.D. Blindfold Squad Drill :—Winners, Stores Depot.

The two highest point scorers were :—AC. Lewis, Stores Depot, 11 points; Cpl. Clark, Aircraft Depot, 11 points.

School of T.T. (Men), Manston.

A review of sport at Manston during the past six months shows quite a satisfactory state of affairs. For the first time the Station won the R.A.F. Cross-Country Championships, and incidentally by a good margin. At the Inland Area Eliminating Contest for the Royal Tournament, the tug-of-war and bayonet teams were beaten, but to compensate for this, a good proportion of successes were gained in the airmen's individual events. These were firsts in foil and épée, seconds in foil and sabre, and thirds in sabre and open bayonet. In the final pool of the Open Bayonet Competition, Manston had four representatives out of a total of seven. In addition, second and third places were obtained in the Novices' Bayonet Competition.

In Association football, teams were entered in four local leagues. One of these won the Cinque Ports Services' League Championship, and another is well in the running for the leading position in the junior division of the same league. The two other teams are pretty certain of obtaining second or third positions in their respective leagues. The Station team reached the semi-final of the Kent Amateur Cup, after beating opponents of the calibre of Borstal Heath, while other teams reached the finals both of the senior and junior divisions of the Deal and Walmer Charity Cup. In addition there are Station Inter-Section and Inter-Hut Competitions, over 50 huts entering teams for the latter.

Under the Rugby Code only six matches were lost out of a total of 20 played. One player represented both the Air Force and Kent County, while no less than ten of the team were chosen to assist the United Services (Chatham). The team also reached the third round of the R.A.F. Cup Competition.

The Hockey team had a very successful season, losing but two matches out of a total of 25. They were beaten in the second round of the R.A.F. Inter-Unit Championship by Henlow, after a drawn game. In the Individual Boxing Championships, the station sent up an entry of 11, which produced the following results : one winner of his weight, one runner-up, five semi-finalists, and the winner of the prize for the best loser of the competition.

R.A.F., Mediterranean.

R.A.F. Unit, H.M.S. "Pegasus" :—Football.—The results during the month were as follows :—v. H.M.S. *Diligence*, lost 1—3; v. H.M.S. *Ceres*, won 4—0; v. H.M.S. *Calypso*, lost 0—2; v. H.M.S. *Campbell*, lost 0—2.

The ship's team includes five airmen at present, with three others who play intermittently. No practice games, or other recreation on shore has been possible owing to the situation of the ship.

No. 267 Squadron, Calafrana :—(a) Football.—The results during the month were :—v. R.A.S.C., won 2—0; v. Sliema Wanderers, lost 0—2 (Cassar Cup); v. R.A.M.C., won 4—3; v. H.M.S. *Egmont*, won 3—2.

Goal scorers for the month were :—L/AC. Harris, 3; L/AC. Boyce, 2; Cpls. West and Williams, L/AC. Arnott and AC.2. Bartelo, 1 each.

Result table to date :—Played 30, won 15, lost 7, drawn 8, goals for 73, goals against 53. No match has yet been lost on the home ground.

Hockey results for the month are as follows :—v. H.M.S. *Concord*, won 6—1; v. H.M.S. *Concord*, won 3—1; v. H.M.S. *Iron Duke*, lost 1—2; v. H.M.S. *Concord*, won 5—0; v. H.M.S. *Centurion*, won 3—0; v. H.M.S. *Iron Duke*, drawn 2—2.

The goal scorers for the month were :—F/Lt. Stewart, 13; F/O. Waring, 4; F/O. Harris, Cpl. Dunn, and L/AC. Peel, 1 each.

Result table to date :—Played 23, won 11, lost 8, drawn 4, goals for 66, goals against 53.

Note :—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* The Aeroplane *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

M. BARBOT'S CROSS-CHANNEL FLIGHT.

M. Barbot, flying the Dewoitine monoplane which has been evolved from the very successful Dewoitine gliders made a successful flight from St. Inglevert to Lympne and back, in an attempt to win the "Matin" Prize for the first return trip across the Channel on an aeroplane with an engine of less than 1,500 cub. cms. capacity.

The attempt was to have been made on the afternoon of Saturday, May 5, and in fact M. Barbot left St. Inglevert and climbed to some 5,000 ft. over the French coast. As however owing to some misunderstanding a seaplane and motor-boat escort which was to have covered his crossing failed to appear no attempt to cross was made. He flew for about two hours over the French coast instead.

On Sunday M. Barbot left St. Inglevert at 6.20 p.m. (B.S.T.) He is reported to have climbed to about 5,000 ft. before crossing the Channel. He arrived at Lympne at 7.21 p.m. (B.S.T.) breaking an undercarriage wire in landing. This was repaired in half an hour.

At 8.1 p.m. he left, taking 120 yards to get off. He reached St. Inglevert at 8.45 p.m. (B.S.T.)

The machine employed is the same as that with which flights already reported were made at Toulouse.

The Anzani cycle-car engine has however been replaced by a 16 h.p. two-cylinder Clerget engine of 1,130 c.c. capacity. This engine was exhibited at the Aero Show in 1920.

The distance from St. Inglevert to Lympne is 58 km. The total time outwards was 61 mins., average speed 57 km./h. (37 m.p.h.), and on the return journey 44 mins., equal to 78 km./h. (47½ m.p.h.) The average speed over-all was about 42 m.p.h.—which is about what one would expect. It is said that about 2 gallons of petrol were consumed but there is no check on the statement.

It should be pointed out that the 1,130 c.c. capacity of the engine used on this machine is 50 per cent. above the limit which is to be imposed on English machines of this class in the competitions to be held this year. But it should also be remembered that British motor-cycle and light car engine designers have no equals in the art of getting the maximum power from the minimum cylinder capacity, and that there are 750 c.c. British engines which are capable of a sustained output probably greater than that possible with the Clerget engine used by M. Barbot.

A NEW BRISTOL RACER.

One gathers that a new and highly secret racing monoplane has been built by the Bristol Aeroplane Company and is now undergoing tests in the hands of Major E. L. Foot. No details are available whatever but apparently it is not the unsuccessful monoplane of last year. Presumably it has a 400 h.p. Bristol "Jupiter" engine and probably a retractable undercarriage.

The Bristol Aeroplane Co. Ltd. hope to win the Aerial Derby and other big races this year.—G. D.

DECK-FLYING IN JAPAN.

The following letter from Colonel the Master of Sempill, who organised the British Naval Air Mission which has done so well in Japan, will be found of considerable interest :—

"Sir,—In your issue of Apr. 18 you referred to the fact that the Mitsubishi Company's Test Pilot Captain Jordan (late R.A.F.) had landed one of his Company's machines on H.I.J.M.S. 'Hosho.' This demonstration, as in the case of all others given by him, was very skilfully carried out.

"The Mitsubishi machines are designed by Mr. Smith (at one time with the late Sopwith Aircraft Co.) to fill the specifications of the Imperial Japanese Naval Air Department.

"I think that you might care to mention in your next issue that Lt.-Commander H. G. Brackley, I.J.N., Senior Pilot on the Staff of the British Aviation Mission which is advising and instructing the Naval Air Service, has been landing on and flying off H.I.J.M.S. *Hosho*, using several types, both for purposes of instruction and experiment. All landings so far carried out by him and the Naval Air Service Pilots under his instruction or in fact by Captain Jordan have proved entirely successful.

"(Sgd.) W. Sempill."

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Berlin *to* London *in* 6 (*flying*) hours

By Capt. Hinchliffe of the Daimler Line

On April 30th and May 1st, Capt. Hinchliffe (Daimler Line) made the return flight London-Berlin-London in a D.H.34 (450-h.p. Napier Lion engine).

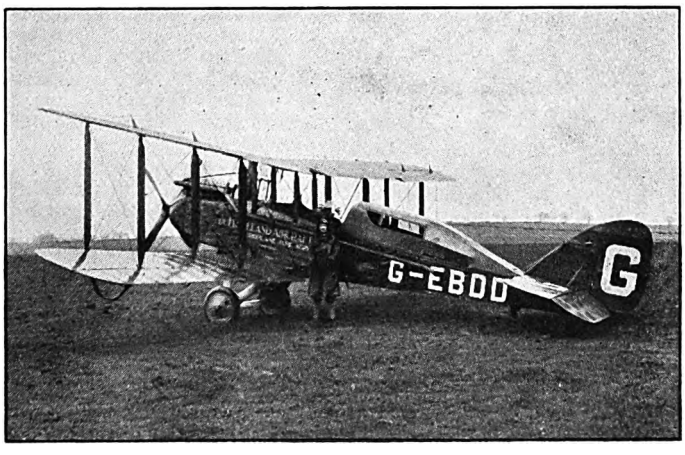
His times were: London to Berlin (673 miles), 9½ hours—6 flying hours. Berlin to London (against headwind), 11½ hours —7½ flying hours.

The machine was lubricated with Wakefield Castrol "R."

WAKEFIELD Castrol REGD. R

C. C. WAKEFIELD & CO., LTD.
All-British Firm. Specialists in Motor Lubrication.
Wakefield House, Cheapside, LONDON, E.C.2

DE HAVILLAND AEROPLANES.



The D.H.9c.—Using machines of this type exclusively, The DE HAVILLAND AEROPLANE HIRE SERVICE has already completed over a quarter of a million miles, running at a fare to the hirer of 2/- per mile.

The DE HAVILLAND AIRCRAFT Co., Ltd.,
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EDGWARE, MIDDLESEX.
Telephone: Kingsbury 160 & 161.
Telegrams: "Havilland, Edgware"

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BY MOTOR-GLIDER TO AMSTERDAM.

"If you've a 'phone you've a Daimler," I have frequently read in advertisements (not, unfortunately, in THE AEROPLANE). I had a 'phone and therefore after using it on the correct wave length, I had permission from the General Manager of the Daimler Airway to go to Holland and back on their afternoon service on Saturday last.

Motor-gliding being the fashion, and as one fails to find in the daily press any difference between a motor-glider and any other kind of perfectly good power-driven aeroplane one may describe the machine as a D.H.34 motor-glider G-EBCX with 450 h.p. Napier "Lion" auxiliary engine. It carried eight passengers and was piloted by Mr. W. R. Hinchliffe.

We left Croydon at 12.52 hours. There was practically no wind on the ground but what little there was blew from the S.E. We taxied down to the N.W. corner and, with our tail right in the angle of the fence, opened out. Owing to the heat the air was very thin and with the heavy weight and lack of wind and the fact that the ground in this direction is uphill we took a longish run but cleared the fence round the aerodrome by 50 ft. or more and thereafter climbed rapidly to 2,000 ft. or so. Above 500 ft. there was a stiff wind from the S.E. of 25 m.p.h.

The sun was very hot indeed and before we reached Maidstone I took off my coat and finished the journey in shirt-sleeves.

At Canterbury the Cathedral stands up and dwarfs everything else. Away to the right the coast-line was visible as far as Beachy Head.

We passed over Dover at 13.42 and began to glide the Channel using a biplane with a 450 h.p. engine. In mid-Channel we passed the Instone outfit from Cologne which was gliding the Channel using a biplane with a 450 h.p. engine.

We turned left at Calais and proceeded to glide up the Belgian coast still using the same motor-glider, a biplane with a 450 h.p. engine. We passed Gravelines and Dunkirk. Then we saw Nieuport where the trench line used to reach the sea and the left flank man of the Allied Armies used to stand in the sea and wait for Army to do a left wheel. Little can be seen of the marks of the war except the new bright red roofs to all the houses anywhere near the old front line. Then we passed a long straggling line of re-roofed villas as far as Ostende where the Kursaal, Racecourse and Aerodrome are prominent landmarks.

The coast is bare until Zeebrugge is reached where the famous mole can be seen and one of the block ships still lies semi-submerged. When one sees this bit of coast from the air one perceives how very wide awake the Dover Patrol must have been to ensure the comparative immunity of the Channel and the Straits of Dover.

The Belgians do not seem to make much use of Belgium. There are very few towns near the sea and all the rivers appear to have been "seen off" to the sea whither they are all gently led away by moles.

The next point of interest was the beginning of Holland which is a continuation of the Belgian coast before reaching the first of the Dutch Islands. The Dutch, like the Belgians, appear to do nothing with this odd portion of land, it isn't even painted a different colour to show aviators when they are over Holland. Why on Earth they do not give it to the Belgians to do nothing with I could not make out. Geographically it belongs to Belgium and it would probably bring in as much to Holland with ferry-fees, no matter to whom it belonged.

On the first Dutch Island we passed over Flushing which has quite a respectable aerodrome and on this island also I saw the first Dutch windmill. I did not see the second until we reached Rotterdam but the famous Dutch black and white cows were everywhere. The next portion of the trip is over half a dozen islands which comprise most of the seaboard of Holland and are divided by estuaries, deltas, fiords, broads, rivers, canals and what-nots. On these estimable estuaries, deltas, fiords, broads, rivers, canals and what-nots were numerous barges, boats, sloops, yachts and other craft and in one place a yacht race was in progress.

At 15.30 we arrived at that much over-rated aerodrome Rotterdam. It is a very good aerodrome but nothing out of the ordinary. They cannot seem to help having large flat places in Holland, though over most of the country they cut it up in small oblongs by means of dykes just to make it more amusing for flying. The Dutch were a far-sighted race.

We disembarked four passengers at Rotterdam and took off for Amsterdam at 15.40. We passed over Rotterdam which is a fine-looking port. I seem to remember a song in the days of my youth which ended with the words "but we've got a hotter lot in Rotterdam." I looked for them but I could not see them.

During the next 20 minutes we passed over nothing but dyke-dissected country and at 16.00 we landed at Schiphol aerodrome, Amsterdam. I was under the impression that the Daimler Airway and the K.L.M. co-operate, but from the K.L.M. attitude, boycott would seem to be the better word. No K.L.M. officials helped in any way and one is told that on one occasion the pilots of the Daimler machine have actually had to do the filling up themselves. It seems a very petty view to take and looks as though the K.L.M. people view the advent of the splendid D.H.34 with misgiving.

Just as we arrived the new Fokker FV 8-seater with Rolls-Royce "Eagle" went for a flight. It seems a trifle slow but has a very good slow landing speed which is so necessary in Holland.

The aerodrome here is quite good though the shed accommodation is somewhat confined. One of the canals runs along the side of the aerodrome and a very artistically designed café is built on its banks with terraces from which one can refresh oneself and watch the flying at the same time. That is exactly what is wanted at Croydon.

At 17.20 we started back again with three passengers. Some difficulty was experienced in turning the machine owing to its fouling some sort of a planking causeway and here again I noticed the alacrity with which the station-master and the K.L.M. officials effaced themselves when help was wanted. After a delay they came and offered a little help with the chief engineer directing operations in a very lacadaisical sort of way. Altogether from what little I saw of them I was not impressed by the Dutchmen though I am assured that this is an isolated case. Anyway the Dutch pilots themselves are an exceptionally nice lot.

We took off over the sheds with a good "zoom" and followed a more westerly course over Leyden (presumably whence the jars come) and The Hague. The latter is a very fine looking city seeming to have some magnificent buildings. The masts of the famous wireless station stand out and can be seen for miles. We passed over the Hook of Holland and steered a course down the points of the islands. The weather seemed even hotter here so we climbed steadily in search of cooler air. It began to get more comfortable at 5,000 ft. and eventually we stopped climbing a little below 7,000 ft.

After an hour or so at this height it got slightly chilly and I had to put on my coat (ordinary coat, called by tailors "Norfolk"). It was never cold enough for a flying coat and a flying helmet was only necessary to keep one from being blown about too much. We followed the coast of Belgium down keeping about five miles out to sea and strove out for the English coast which looked a sort of purple colour in the setting sun.

A flotilla, squadron, covey, bevy, crocodile (or in whatever they go out) of destroyers was manœuvring as we started to glide the Channel using a biplane with an auxiliary engine of 450 h.p. The English and French coasts could both be seen clearly the whole time. We finished gliding the Channel (still using a biplane with an auxiliary engine of 450 h.p.) over Deal.

From here we could see the whole of the Kent coast, as one sees it on a map, from Dungeness to Sheppey. We started going slowly down hill and as we reached the 3,000 ft. level it was like going into a Turkish bath. We went to about 800 ft. over Tonbridge to take photographs and then up again. Over the hills it was very bumpy and we got thrown about all over the place. The Crystal Palace could be seen from Tonbridge sharply silhouetted against the sky. Over Biggin Hill we sighted the aerodrome which we reached at 20.30 hours and after the statutory circuit we made a perfect landing having covered 600 miles in six hours. Personally I was frightfully tired but such a flight is an ordinary day's work for a pilot. In actual fact Mr. Hinchliffe had already flown up from Lympne that morning.

I would like to take this opportunity of dissociating myself from the views that a civil aviation pilot has no more responsibility than a taxi driver and less than an express engine driver. As anyone who has flown to any extent knows that the responsibilities in taking a load of passengers to Paris, Cologne, Amsterdam, Berlin or anywhere else in really bad weather are tremendous however well a pilot may know his route and his responsibilities are much more in keeping with the captain of a liner only more so.—C. D.

[An engine driver has the responsibility of probably 300 lives and about £20,000 worth of rolling stock. When adequate signal stations are set up along our air lines the pilot's responsibility will be less than that of, an engine-driver. At the moment he requires greater initiative.—C. G. G.]

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

RIPS PER DAY.—Monday, 15; Tuesday, 19; Wednesday, 16; Thursday, Friday, 22; Saturday, 18; Sunday 7

DON—PARIS :

andley Page Transport, Ltd., machines 28, passengers 224, freight 2 lbs.; Air Union, machines 26†, passengers 85, freight, 25,445 lbs.; al machines 54, passengers 309.

DON—BRUSSELS—COLOGNE :

istone Air Line, Ltd., machines 21*, passengers 91, freight —.

CHESTER—LONDON—AMSTERDAM—BERLIN :

aimler Airway, machines 21, passengers 45, freight —

DON—ROTTERDAM :

.L.M., machines 14, passengers 26, freight —.

IAL MACHINES :

e Havilland Hire Service, machines 7, passengers 4.

otal number of trips by British machines : 77, carrying 364 pas.

eign machines : 40, carrying 111 pas.

STATISTICS.

week ending May 6 :—

lachines, 117; Passengers, 475; Crews, 191; Total Personnel, 666

responding week last year :—

lachines, 109; Passengers, 234; Crews, 156; Total Personnel, 390

responding week, 1921 :—

lachines, 65; Passengers, 227; Crews, 79; Total Personnel, 306.

responding week, 1920 :—

lachines, 84; Passengers, 126; Crews, 96; Personnel, 222.

These machines also carry loads of freight.

Some machines are freighters only. The Air Union runs an ly morning machine carrying newspapers daily from Lympne to is.

Croydon Notes.

There has been a big boost in the passenger traffic owing the fine weather this week. There were 475 in all out of ich 225 were carried by Handley Page Transport Ltd. at firm ran four machines a day in each direction and e understands that they are shortly to run six machines day.

The old original W.8 G-EAPJ is now running regularly on e service with Rolls-Royce engines. She is quite satisfactory, though being somewhat heavier she will not take e load which the other machines carry. Otherwise her rformance is almost equal to that of the W.8bs.

In the advertisement columns this week Handley Page ansport Ltd. are asking for a pilot. He should if possible ve had experience with twin-engined machines and all pplications must in the first instance be made in writing.

The Daimler Airway now have their full route from Manester to Berlin in operation and notes on their activities ll be found under a separate heading.

Mr. Hinchliffe recently had a forced landing with G-EBBQ rough a minor engine trouble on the small island of the olland group. He landed on the sand at the water edge, case he was unable to take off again. This proved to be and he was able to get a barge right up to the machine id take it direct by water to Rotterdam aerodrome. Here new engine was installed.

With the old engine in the cabin and accompanied by r. Youell on G-EBBS he left Rotterdam at 19.00 hrs. on riday. It was dark when they reached the Channel so ey both landed at Lympne at about 21.45 hrs. They started at 05.00 hrs. the next morning and reached Croyon in about half an hour.

One hears that their landing at Lympne was a very pretty erformance. Mr. Youell who had no lights followed Mr. inchliffe's illuminated machine and while the watchers a the aerodrome were looking at the lighted machine rcling round the dark machine came in and landed.

Mr. Hubert Broad on a D.H.9 of the De Havilland Hire ervice left Croydon at 05.55 on Thursday morning and returned again on Friday getting to Croydon at 20.01 hrs.

Other De Havilland pilots have been active during the eek.

Col. G. L. P. Henderson, for the Instone Air Line, has een to Plymouth on a D.H.4a carrying out mail experiments or the Plymouth Chamber of Commerce during the week. urther experiments are to be made this week and this Wednesday) afternoon a flight will be made from Plymouth o Manchester.—G. D.

London to Berlin.

The Daimler Airway opened the Berlin section of their air oute on Monday of last week. Mr. Hinchliffe left Croydon t 10.26 on the famous Napier-engined D.H.34 G-EBBS with ight passengers. He called *en route* at Amsterdam, Bremen nd Hamburg and finally landed at Berlin at 19.40 hours. he weather was very bad and Mr. Hinchliffe had to fly ow the whole way. He speaks very highly of the assistnce, courtesy and ability of the Germans with whom he ame into contact and their manners were in marked contrast with those of some other foreigners.

He restarted at 09.00 hours on Tuesday and until he reached Croydon at 20.35 hours the Napier engine never ceased to run even when filling up with petrol.

In future the Daimler Airway will until further notice run a machine from Croydon to Berlin every Monday returning on Tuesday and the Germans from this week on will also run a through machine from Berlin to London returning on Tuesday. On other days the Daimler Airway will run from London to Amsterdam to connect with a German machine from Amsterdam to Berlin

Mr. Hinchliffe is making the trip again this week with eight passengers accompanied by Mr. Robinson as second pilot.—G. D.

Manchester.

The Manchester Aviation Company have had a comparatively quiet week. There has been a little joy-riding and photography and Mr. Dickinson with a commission agent (presumably "bookie" is the more familiar word) as passenger flew over Bolton to welcome an association football team which had won a match in London at a place called the Wembley Stadium. Presumably the said C.A.'s excitement was due to the fact that the team for which he watches had not previously won many matches.

Helicopters on Circuit.

It is reported that on May 2, the Oemichen helicopter, which has been constructed at the Peugot works made a flight in a closed circuit of 120 metres total length at Valentigny (Doubs). It is said that only the limitations of the test ground precluded a longer flight.

Not to be outdone more than possible, the Pescara helicopter very shortly afterwards made a straight flight of some 60 metres at Issy-les-Moulineaux.

The new Oemichen helicopter consists of a cross-shaped frame having at each extremity a lifting screw, two on the fore and aft line and one on each side. The fore and aft screws are 6.4 in. dia., the two lateral screws are 7.6 in. dia. Four auxiliary screws, of small diameter and variable pitch are, mounted, each coaxially with one of the main screws, and by these variable screws the machine is kept in balance.

In addition a horizontal tractor is fitted.

The whole series of screws are driven by one single 110 h.p. Le Rhone engine. The machine, loaded, weighs about 1,900 lbs.

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THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, MAY 16, 1923.

Vol. XXIV. No. 20. SIXPENCE WEEKLY. [Registered at the G.P.O. as a Newspaper.

A JAPANESE JUNKERS

KAWANISHI No. 2:—A Japanese-built Two-seater Monoplane distinctly of Junkers ancestry. Hall-Scott 200 h.p. Engine. Span 6.580 m. Length 9.670 m. Height 2.560 m. Area 13.300 sq. m. Speed (estimated) 160 m.p.h.

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When there is arduous work to be done or new records established, whether it be by aeroplane, motor car or motor cycle, the expert unhesitatingly chooses "K.L.G." Sparking Plugs. There is a reason for this marked preference—

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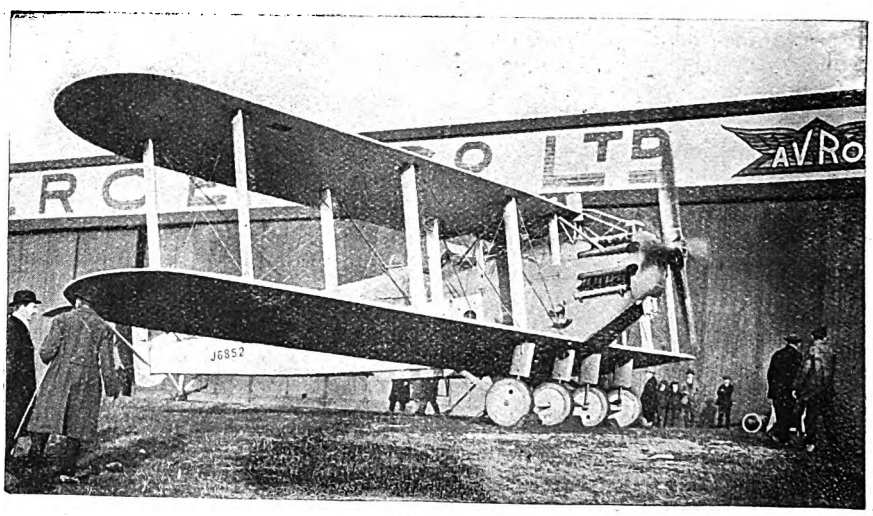
AVRO LEADS AGAIN!



THE machine illustrated is the 1000 h.p. Avro-Napier Bomber, which was successfully taken into the air in December last.

It is the most powerful single-engined aeroplane in the world and was designed and constructed by A. V. ROE & CO. LTD., of Manchester, London, and Southampton.

The Most Powerful Single-Engined Aeroplane in the World.

THE 1000 h.p. Avro-Napier Bomber, which has proved so successful in flight, marks another step forward in Aviation. Never before has a machine with such a high-powered engine taken the air successfully. It is significant that this aeroplane was designed and constructed by A. V. ROE & CO. LTD., and it is a great tribute to their organisation and resources.

This Bomber is a further development of the AVRO "Aldershot," which won the Air Force Handicap at the last R.A.F. Pageant. It is fitted with dual control, and the whole of it, with the exception of certain parts of the wings, is constructed of metal. The wings are designed to fold back so as to economise space when the machine has to be stored.

A. V. ROE & CO. LTD. invite inquiries for information concerning the building of machines for special purposes, or for the supply of AVRO standard aeroplanes or seaplanes.

A. V. ROE & CO. LTD.,

Avro Works, Newton Heath, Manchester.

LONDON OFFICES: 166 PICCADILLY, W.1.
EXPERIMENTAL WORKS: HAMBLE, SOUTHAMPTON.

AUSTRALIAN AGENTS: THE AUSTRALIAN AIRCRAFT & ENGINEERING CO. LTD., UNION HOUSE, 247 GEORGE STREET, SYDNEY, N.S.W.

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MAY 16. 1923.

THE AEROPLANE

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ON ENLARGING THE ROYAL AIR FORCE.

On May 9 a statement was made in the House of Lords which vitally affects the whole future of the British Empire. The agitation which has been in progress for so long in all sorts and kinds of newspapers concerning the strength or weakness of the Royal Air Force has concentrated public attention on the deliberations of the Committee which has been sitting for some time to consider the relative positions of the Navy, the Army and the Air Force and the result of those deliberations has been anxiously expected. Whether any official report will ever be published by the Committee is doubtful. The Committee of Imperial Defence is not in the habit of broadcasting its decisions. As a rule the department concerned merely gives effect to these decisions. But in this case the Marquess of Salisbury who presides over the Committee which is inquiring into the position of the services stated definitely on the day mentioned that "a considerable increase in the Air Force will be necessary."

It now remains to be seen how great that increase is to be and the particular way in which the increase is to be made. That is to say whether the Royal Air Force as such is to be increased or whether in addition to the R.A.F. as it is we are to have two additional Air Services, one for the Navy and one for the Army.

The Question.

The question of our air weakness was raised by the Earl of Birkenhead who had raised the same question in another form on Mar. 21. On May 9 the following notice appeared on the Order Paper:—

"To ask His Majesty's Government what information they have as to the construction of aircraft in Germany—

"1. For military and naval purposes;

"2. For commercial purposes;

and to ask what is the policy of the Government in relation to the standard of air strength which the security of this country requires."

The Point at Issue.

It will be noticed that on this occasion the real point at issue was skilfully camouflaged by pretending that the question referred to the construction of aircraft in Germany. Those who have any knowledge of the unhappy state of the German Aircraft Industry will merely smile at the form in which the question was put. All who are in any way connected with aviation know perfectly well that for many years to come there is no air danger from Germany, and that the real German air danger is Germany's weakness in the air which may very well make it impossible for her to defend herself in a few years' time against the influx of Eastern barbarians.

When that time comes it will be our big Air Force which will be the main defence of Western civilisation. And when our Air Force is being hard pressed on the Eastern Front they will do well to remember that they owe their hardships to the insensate action of the Commission Aéronautique Inter-Alliée which insisted on destroying Germany's Aircraft Industry.

LORD BIRKENHEAD introducing the question admitted that if any Government was to blame for our aerial weakness it was the Government of which he himself had been a member. He said that on the day of the Armistice we had in this country an Air Force which was not surpassed by any in the World. It was true of our people that the moment the crisis was over they immediately resolved that no other was likely to arise. Therefore all our military preparations were at the earliest possible moment abandoned.

With the disappearance of our military forces came the disappearance of our Air Force. This was far more serious because we had after all faced hundreds of years of insular life with the security of our Navy, only protecting ourselves upon the military side by a small but extraordinarily competent Army. It had become clear that it was no longer possible to estimate the security of this country in military or naval terms, but that there had arrived a third term—namely, that of an aerial security. Formerly we were content with the security that our Navy was equal to the Navies of any other two Powers in the World. The air menace at that time had not arisen.

Lord Birkenhead then said: "There has emerged this new danger, and I do not think that the nation has even yet accustomed itself to the new standards which are imposed on us unless we are prepared to be content with a standard of security which would have been swept away with national derision and contempt because of its gross inadequacy in days when we measured our security in terms of navies. And yet cannot we afford to adopt any different standard? Can we justify ourselves before the nation if we are compelled to say to them that there exists a Power—however friendly to us that Power may be—against which we are in a position of inferiority so striking that defence would be almost impossible?"

Continuing he said that the maintenance of the maximum degree of friendship with the French nation is dear to the heart of every Englishman but history has shown that enmities are not unappeasable, and that friendships are not unestrangeable. It had been the policy of our ancestors for hundreds of years that we should claim to ourselves with the utmost courtesy of language the right to undertake the duty of guaranteeing to the citizens of this country the most complete and absolute security.

The noble Duke who so well represented the Air Ministry had said that we had 34 squadrons and 395 machines while the French figures were 140 squadrons and 1,260 machines. The exact distribution of these squadrons was a secondary topic. He added: "It must be plain that the disproportion in the air strengths of two neighbouring countries, however friendly the relationship between those countries, is so alarming that no Government can allow it to continue."

The Salisbury Committee.

Lord Birkenhead drew attention to the fact that the subject was at the moment under the consideration of a Committee over which Lord Salisbury presided. It was no part of his purpose to ask Lord Salisbury to anticipate in any way the deliberations which might be taking place. His purpose was to persuade their Lordships and his fellow-countrymen, through such publicity as this debate gained, that this problem of air defence was as vital a question as was the strength of the Navy to those who had preceded them in Parliament in the last thirty years.

He reminded the House that he had sat as a member of the Cabinet Committee which was appointed to intermediate (if he might use the expression) between the Geddes Report and the different combatant Services. He had done something to mitigate the effect of the Geddes recommendations in relation to the Air Force. He thought that if that Committee had been more fully informed they would have been disposed to go even further for he clearly recollected that the full publication of the relative contemporary air strength of the two Powers was not made to the Cabinet for some weeks after the discussion took place.

The One-Power Standard.

He had read with the deepest interest a speech which the Air Minister had made a few days ago in which he stated plainly that the air strength of this country was not great enough for its protection and for its security. That statement made it evident that the Government had already formed the interlocutory conclusion that some reinforcement of that strength was desirable. The purpose of his remarks that night was to make it plain that we must reach some standard. Unless there was a standard no construction upon principle could take place and no Government and no Department knew where it stood and no technical adviser knew where he stood.

Lord Birkenhead then emphasised the fact that the people in this country could not be content and ought not to be content with any strength in the air which was less than that of a one-Power standard. He knew perfectly well of the need for sustained and even added economies but it was not and could not be an economy that this country should be at any moment insecure and the premium of insurance was small

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indeed in relation to the wealth which even after the War was represented by the possessions of this country.

The German Question.

Turning then to the German question Lord Birkenhead said that he desired to have it made plain whether there was any such formidable menace in the centre of Europe as an alarmist section of the Press had attempted at intervals to convey. He had read statements that there was an immense almost feverish construction of aircraft taking place in Germany and also in Russia under the guidance of German artificers. All the information available to him as a private member was in the other direction.

He took the responsibility of introducing this subject again because he felt deeply about it. He hoped that he had done it without offending any legitimate susceptibility and his object would have been attained if he had directed some degree of further public attention to a matter which he regarded as so grave.

A Former War Minister.

The Viscount Haldane agreeing with Lord Birkenhead's speech said that it was not enough to take the gross numbers that foreign Powers have in measuring what you require for security against invasion by the air. Aeroplanes in their numbers were after all what the mathematicians called functions of the infantry forces of the country. If a country had very large infantry forces they might have more aeroplanes than countries which had smaller infantry forces. But there was also what the mathematicians call a "constant" and that was a force which any foreign Power has available for a hostile expedition in the air against this country, and that required a premium of insurance to be paid.

If we were not in a position to cope with any attempt on our security even although war might not be likely it would be found very expensive to have failed. Foreign Chancelleries would know our weak spot and we would find difficulty in diplomatic negotiations.

For that reason he agreed that we should have a proper home defence force against air attack. The improvisations of the War did not afford a basis on which the Air Force in time of peace in a permanent form could rest. That was the problem with which the present Government had to deal. He would like to hear that the Government were concentraing in the first place on building up the best Air Staff the country could produce.

He had read in the papers of a proposal to spend £9,000,000 on naval works at Singapore. It might be a most desirable thing to do. We might require it because of the new naval distribution. But to begin such an expenditure and pass by the much more pressing expenditure required for a small Air Force for the defence of the country seemed to him insanity. There was far more urgency in putting the Air Force right that there was in spending large sums in the East. The Air Force should come first.

The Official Reply.

The Lord President of the Council (The Marquess of Salisbury) said that he felt some reluctance in rising in place of the Duke of Sutherland who was the responsible Minister for the Air Department in their Lordships' House. He did so because he happened to be at this moment Chairman of a very important Committee which was inquiring into the subject. Whether the reason was good, bad or indifferent which led the late Government to their decision in regard to the Air Force at the moment of demobilisation the difficulty remained the same.

Lord Salisbury said "Germany is forbidden by Article 198 of the Treaty of Versailles from possessing any naval or military Air Force, and by the Nine Rules that were drawn up by the *Commission Militaire Allié* [Thus Hansard] from constructing any machines, civil or military, that have a substantial value for military purposes."

He added that from the information at the disposal of his Majesty's Government there was no reason to suppose that the German Government is contravening either Article 198 of the Treaty or the Nine Rules. It did however seem to be the case that the German Aircraft Industry was being to some extent developed outside Germany.

As to the second part of the question he said "There are at present in use in Germany 111 commercial machines of 30 different types, 84 of these being old type military machines. These 111 machines are being used on the following lines:—The Aero-Lloyd and the Junkers. [It is a pity that Lord Salisbury was not better informed on this point. —C. G. G.] The commercial machines in course of construction all comply with the Nine Rules, with the exception of the airship which is being built in Germany for the Government of the U.S.A."

As to the question of standards Lord Salisbury said that it would be premature to make a statement at the moment. Undoubtedly the air strength of any Power, friendly or otherwise, must react upon ourselves. He would be very sorry if there were any idea that we were creating our Air Force because of any threat of aggression from that great friendly Power. Of course we remained friends with France.

It was not quite fair to criticise the French for the creation of their Air Force. After all the condition of Europe was still one of great tension and unrest and no one had a right to complain when a Power placed as France was placed thought it right to create what appeared to be day by day the kind of force which is of increasing importance in the defence of any country.

We must avoid if we could any return to that terrible competition in armaments which the noble and learned Earl himself deprecated. Let us hope that the good sense of European statesmen would find some way of avoiding that suicidal competition which was pure waste from the point of view of the prosperity of a people and only led ultimately to a temptation to war.

The present Government had lost no time. The Air Minister devoted his attention to the increase of our Air Force within a very few days of taking office. The Government were very anxious in whatever they did to carry public opinion with them. The Air Estimates provided for a certain increase. Eighteen squadrons were provided and they would be pushed on with all due despatch. No greater haste could have been made in the provision of air strength working to the ordinary normal rules which prevail in time of peace.

At the same time the Government appointed the Committee which had been so often mentioned that afternoon. The Committee had had sixteen sittings since the subject was last discussed in their Lordships' House. Any number of memoranda had been prepared and witnesses had been heard. They had dealt with every part of the subject—the development of aircraft, the range of aircraft, the personnel, what the relations should be with the Navy, and, most important of all, what the total strength of the Air Force ought to be.

Lord Salisbury concluded thus: "A final conclusion has not been come to; that would be premature. But the Cabinet has come to this conclusion: that they think a considerable increase in the Air Force will be necessary.

"I can assure your Lordships that whatever is necessary the Government will do their best to supply. We shall come frankly to Parliament and frankly to the country and tell them what are the results of our deliberations, which we have done our utmost to make fruitful with all the talent and experience which the permanent Service of this country afford us. When we have come to our conclusion we shall come to Parliament and ask Parliament to support us in whatever may be necessary."

Merely Editorial.

There is no doubt that the question of air defence has been thoroughly ventilated during the last two or three months. To the credit of the British Press be it said the views expressed by the three noble Lords certainly obtained all the publicity they could have wished.

Similarly Sir Samuel Hoare's speech at the Constitutional Club a fortnight or so ago when he stated definitely that the Royal Air Force was too small was given a large amount of publicity. Unfortunately owing to the chronic exiguity of space in The Aeroplane (until such time as Air Ministry orders make it possible for the Aircraft Trade to give better support to this paper) it was impossible to report Sir Samuel Hoare's speech as it deserved. Moreover, as all readers of this paper are already well aware that the R.A.F. is too small and could give at least ten times as many reasons in support of the statement as Sir Samuel Hoare had time to give it seemed unnecessary even to mention the fact so long as the unaeronautical Press did so.

The *Times* newspaper, which since it attained to this freedom from harmsworthful influence has dropped its Get-Out-Of-Iraq policy and has dealt with aeronautical subjects purely on their merits, has again let loose General P. C. R. Groves in one of its most important columns. One disagrees cordially from General Groves on many subjects especially in his silly idea that commercial machines can be made convertible into war machines and still be commercial propositions. If one had time and space one would take much pleasure in abolishing General Groves as one has in the past abolished sundry other false prophets of aviation. But meantime even General Groves serves to stir up public interest in the air defence question.

The "Post's" Opinions.

Then that excellent paper the *Morning Post*, ever the home of lost causes, has for months been carrying on a violent campaign in favour of the Navy having its own Air Service. So violent have been the attacks that they have certainly conveyed the general impression that the Air Ministry is composed of an egregious collection of incompetents and that the main object of the Air Staff is to ruin the usefulness

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Proveedores del Almirantazgo, Departamento de Guerra y Ministerio de Aviación Britanicos.

Unicos poseedores de la patente Fairey de dispositivos de combeo variable para aeroplanos, hidroaviones y barcos aéreos.

Diseñadores y constructores de hidroaviones, barcos, aéreos, aeroplanos, aparatos anfibios, de todas clases, tambien de aparatos especialmente adecuados para el levantamiento de cartas topográficas y fotográfias, hangares flotantes y completo equipo para estos mismos.

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of the Navy by depriving it of all ancillary aircraft. And the *Morning Post* has religiously concealed the fact that the Air Council has spent more money on new experimental naval aircraft than on any other types and that it has provided more Service aircraft for the Navy than the Fleet can accommodate.

At the same time the *Morning Post* is always very well informed as to what is going on behind the scenes and therefore an extract from a long article which appeared in that paper last week is worth very careful consideration as it may very possibly indicate the decision which Lord Salisbury's Committee ultimately intends to take. This extract reads as follows :—

"It will clear the air greatly if the Board of Admiralty and Army Council makes it perfectly evident that they regard the Royal Air Force as an essential fighting Service on a par with the Navy and Army, and that they recognise the Air Ministry as the proper authority to administer that Service, to propound air strategy, to co-ordinate all the technique of aviation and matters of research, and the design of aircraft.

"The Royal Air Force should be definitely charged with the defence of this country against air raids and with the necessary counter-offensive measures. In addition, the Air Ministry should be responsible for providing an expeditionary Air Force to operate overseas, usually in co-operation with the air services of the Navy and Army, where these are insufficient by themselves. It should act in an advisory and co-ordinating capacity in relation to Dominion Air Services. It should be the recognised authority for training and qualifying all pilots, and the sole authority for granting flying certificates. Air fighting should be taught at a common school, under the supervision of the Air Staff.

"The provision of reserves of flying and ground personnel for the Royal Air Force in time of war, civil aviation, and air traffic control should all form part of the Air Ministry's duties.

"It will be shown that none of these conditions, considered vital to the future of aviation and the efficiency of the Royal Air Force, need preclude the Navy from having its own Air arm."

From this it will be noticed that the *Morning Post* has suddenly adopted a view much more moderate than those which it has expressed during the past few weeks. Curiously enough it will be found that the scheme outlined above coincides very closely with that advocated by THE AEROPLANE somewhere about the end of 1917 or beginning of 1918 when the Royal Air Force was about to come into being.

It is somewhat strange that the *Morning Post* scheme does not definitely state that the Air Ministry should be charged with the actual supply of aircraft to all three Services. It will be seen that according to the *Morning Post* the Air Ministry should "co-ordinate" in matters of research and the design of aircraft but there is a vast difference between co-ordinating these matters and actually undertaking supply. Personally one is of the opinion that if we are to have three separate Air Services in this way there should certainly be three separate technical departments, simply and solely because by having the three lines of supply one eliminates the existing trouble of having all progress blocked by one fool on a single line.

(To be continued.)

THE "GOLIATH" FATALITY.

On Monday the Farman "Goliath" F-AEBY which left Le Bourgêt for Croydon at 12.30 hour crashed at Monsures near Amiens and every person on board, five passengers, the engineer and the pilot, M. Lemen, were killed.

The machine was of the later type fitted with two Renault engines and belonged to the Air Union.

No details are at present available as to the cause of the accident but the machine appears to have caught fire while flying at about 3,000 ft. It seems possible that the fire may have been caused by a passenger lighting a cigarette and carelessly throwing down the match. Although smoking is strictly forbidden in the air, it is sometimes done in ignorance.

M. Lemen was one of the oldest pilots on the route having flown for the C.M.A. Air Line since 1919.—G. D.

AIR MAIL EXPERIMENTS.

A further experiment was made on Thursday last to demonstrate the speed with which in-coming mails from overseas can be delivered to Manchester from Plymouth.

The experiment was organised by the Plymouth Chamber of Commerce, and the machine used was a D.H.9 (Siddeley "Puma" engine) belonging to the Surrey Flying Services by arrangement with the Instone Air Line. Lt.-Col. G. L. P. Henderson, M.C., A.F.C., was the pilot.

Col. Henderson left Croydon at 10.16 hrs. and reached Plymouth at 12.25 hrs. He carried a letter from the Postmaster-General to the Mayor of Plymouth. The letter was read at a lunch in Plymouth and a reply was drafted to be carried on by air.

The aeroplane left Plymouth at 14.00 hrs. and reached Manchester at 16.40 hrs. where more letters were delivered and answered. The machine left Manchester at 17.26 hrs. and reached Croydon at 19.00 hrs.

A previous experiment proved that mail matter arriving at Plymouth in the early morning could be delivered at the chief western European centres in the early afternoon, by sending it from Plymouth to Croydon by special aeroplane "and thence by aero-bus." This new experiment proved that letters could be delivered in Manchester in about three hours of the time of their arrival at Plymouth.

In this connection it is interesting to note that the Aircraft Disposal Company have recently converted a D.H.9 into a mail-carrier. The machine is a single-seater but every available portion of the fuselage has been made into a hold for mail matter and an enormous amount of mail can be carried at a very high speed.—G. D.

THE R.A.F. MEMORIAL FUND.

The 3rd Annual Report of the R.A.F. Memorial Fund deals with the administration of the Fund during 1922.

A short account of the objects of the Fund and the various activities of the Committee is followed by a list of donations during the 12 months under review showing £785 14s. 3d. from R.A.F. Units and £634 17s. 1d. from other sources, the latter of course including all subscriptions from individual members of the R.A.F.

Among other items is £80 received in February 1922 being the proceeds of the last Sunday concert held at the R.A.F. Depot Uxbridge and the Report adds that it is hoped that it may be found possible to start these concerts again.

One is rather of the opinion that these concerts which evidently proved profitable to a very worthy object besides being an obviously satisfactory means of spending part of an Uxbridge Sunday were stopped owing to untimely interference on the part of the local civilian padres.

The Expenditure Account of the Fund includes expenses of administration £1,335 12s. 4d : grants in aid £4,146 10s. 8d. : Expenses of the Vanburgh Castle School £1,721 15s. 3d., less appropriations *per contra* £374 18s. making a total of £6,829 0s. 3d. The total income of the year (including the proceeds of R.A.F. Pageants, £3,098 16s. 11d.) was £11,582 1s. 4d.

The Committee feel that further and untiring efforts must be made to reach the original aim of the Fund, namely £400,000. So far £119,547 2s. 9d. has been subscribed.—C. M. MC. A.

AIR DEFENCE BRIGADES.

According to the *Morning Post* an Air Defence Brigade comprises the following ground units :—

Air Defence Brigade headquarters; two Anti-aircraft Brigades, Royal Artillery, each of three batteries of eight guns; one Anti-aircraft (Searchlight) Battalion, R.E., of four companies of twenty-four lights each, and an observer section; one Signal Section. To these formations is affiliated a squadron of the Royal Air Force (single-seater fighters).

The units at present sanctioned and in process of formation are :—

One Air Defence Brigade (Regular), less two companies Royal Engineers, and two Air Defence Brigades (Territorial Army).

As regards the Regular Air Defence Brigade, for various reasons connected with personnel, accommodation, etc., only one Anti-aircraft Brigade Royal Artillery has at present been formed. Both the Territorial Army Brigades are now being raised in London.

The equipment includes :—Artillery—3-in. 20-cwt. guns, mounted on lorries on travelling platforms. Royal Engineers—90-cm. or 120-cm. searchlights on lorries or fixed emplacements. Observer sections will be equipped with sound-locaters when a suitable pattern has been approved.

A peace establishment, provisionally approved, allows :—

REGULAR ARMY.

	Officers.	O. Ranks.
Per Brigade, R.A.	20	246
Per Battalion, R.E. (less two companies)	15	443

TERRITORIAL ARMY.

	Officers.	O. Ranks.
Per Brigade, R.A.	32	276
Per Battalion, R.E.	44	714

Instructions in all branches of air defence work is carried out at Biggin Hill, where a school of anti-aircraft defence has been established.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The general effect on the probable performance of light eroplanes with motor-cycle engines of variations in speed nd loading are discussed in the article below.

It would appear from these considerations that the miles er gallon basis for the forthcoming contest will not tend o produce freak low-speed machines.

The question of the choice of engine for low-powered aeroplanes must be a subject of considerable interest at the present moment, and therefore a consideration of the qualities which are required, and of the characteristics of the engines available, is given on page 364.

THE DESIGN OF LOW-POWERED AEROPLANES.—II.

By W. H. Sayers.

The fact that the fixed weights are a large proportion of he whole sets very definite limits to what can be achieved in he way of design.

One cannot instal a 400 c.c. engine, with airscrew and a -gallon fuel tank for much under 50-55 lbs. One can instal 750 c.c. engine for not much more than 80-85. With a ilot at 170 lbs. one has therefore from 220 to 255 lbs. of xed weight to allow for There are other items—such as eat, controls, air-speed indicator, etc, which are practically onstant, and these weights, which are not affected by the esign of the wing or tail design are a very large proportion f the total weight of the aeroplane.

In the case of Mr. Manning's "Wren"—which is a canti ever monoplane of 37 ft. span, the machine, without pilot, ngine or fuel, but with tanks, seat, controls and instru nents, weighs not more than 150 lbs., leaving 210 lbs. for a ery light pilot, engine, airscrew and petrol. The total eight is 360 lbs., so that the structure weight is under 42 er cent. of the total weight.

A saving of 2½ per cent. on structure weight alters the otal weight only by 1 per cent., and if that saving of weight ecessitates a decrease of 1 per cent. in the L/D ratio, the hrust and h.p. required is unaltered. Under these circum tances there is good reason to hold that given good struc ural design, the cantilever monoplane pays by its high effi iency for any increased weight which it may entail.

The Effect of the 1 Gallon Fuel Limit.

This is particularly the case if one is designing specially or the maximum mileage per gallon—as for the Duke of Sutherland's prize. One gallon of fuel supplies a definite uantity of available energy—and although different fuels ave different energy contents one is limited by the possible hermal efficiency of available engines to within fairly narrow imits of available energy by the limited fuel allowance. It vill be difficult to get much more than 16 B.H.P. hours or bout 32,000,000 ft. lbs. out of 1 gallon of any "commercially btainable" fuel. If an airscrew efficiency at the most conomical speed of 70 per cent. is achieved this will give 2,000,000 ft. lbs. available for thrust energy. The thrust nergy is equal to the product of thrust used by distance lown—and therefore the maximum distance which can be overed in still air in feet is 22,000,000 ÷ thrust in lbs.

The maximum air mileage possible is therefore about 4,150 ÷ Thrust Needed, from which it is evident that, so far as he machine itself is concerned the lowest possible thrust is he sole criterion of the possible mileage in still air.

But in practice this is not quite accurate. Except in a lead calm the mileage over the ground will always be less han the air mileage, and for a given wind strength, the aster the machine, the less the loss caused by wind.

Also the speed of flight has its effect on possible airscrew efficiency. It may be found that the speed for minimum thrust of a given machine is so low that an increase of speed, leading to a greater thrust, makes possible an improved air screw efficiency sufficient to counteract the increased thrust energy needed per mile.

There is also the question of the extent to which the engine is throttled. If an engine is very greatly throttled its thermal efficiency is likely to be appreciably less than that of the same engine running at nearly full throttle, and the practical qualities of the particular engine and airscrew employed have to be very carefully considered in this respect.

One point of some importance is the fact that within the limits of engine size available for these machines the larger the engine, the better its fuel consumption per h.p. hour is likely to be.

Speed an Advantage.

Thus provided that the thrust can be kept down, the machine most likely the best results should be obtained with the fastest machine.

Incidentally this indicates that the objection raised to the "miles per gallon" test are groundless. The freak "floating machine" flying at an absurdly low speed will be handicapped in practice by its low speed, and will gain nothing from it. A freak airscrew design may be of some value for the competition—but it will have to be fitted to a machine with the possibilities of a quite good turn of speed and—with a normal airscrew—a pretty big reserve of power.

To show how these various considerations affect practical design an example or two may be taken. Mr. Manning, in designing the "Wren" sought to produce a machine which would fly on the minimum possible power and it is not likely that anyone would attempt to win the Duke of Sutherland's prize with a machine of a very much lower cruising speed. As approximate figures of dimensions, weights and performance are available for the "Wren" it is convenient to take that machine as a basis for comparison.

An Example.

The "Wren" has a span of 37 ft., and an area of 142 sq. ft.—giving an aspect ratio of 10.3. The weight is 360 lbs.—a wing loading of 2.56 lbs./sq. ft. The speed for minimum thrust on this machine would be expected to be about 40 m.p.h., and a gliding angle of about 1/14 should be obtained from the complete machine.

The minimum thrust will therefore be about $\frac{360}{14} = 26.7$ lbs., of which the wings alone, at an L/D of 18, will require 20 lbs., leaving 6.7 lbs. as body resistance. The theoretical air mileage would be about 155 miles per gallon.

Can the "Wren's" most economical speed of 40 m.p.h. be increased without increasing the thrust appreciably? If it can then the higher speed design should beat the "Wren" on petrol consumption.

To increase the most economical speed, the wing loading must be increased. Doubling the loading would put the best speed up from 40 to 56 m.p.h. Assume for the moment that one can double the loading without changing the total loaded weight. Then one has to obtain the same best overall L/D to obtain the same thrust at the increased speed.

The total weight being the same, the wing area must be halved. One can halve the wing area, keeping the same

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aspect ratio. The wing span and wing chord will then have to be reduced to 71 per cent. of the original figures. Theoretically wings of these dimensions, but of doubled loading should weigh 71 per cent. of the original wing weight. They would actually weigh more, but, with the reduced chord and the smaller shift of C.P. a smaller or a shorter tail could be used, and in fact one could probably save about 30 per cent. of the weight of the original wings on the whole structure of the new design. One has no data as to the weight of the "Wren's" wings, but they can scarcely weigh less than about 80 lbs.—so that one may save about 24 lbs. on the structure weight. The " Wren's " engine has a reserve of power sufficient to allow it to fly the new design—but it may be wished to fit a bigger engine. The saving of structure weight will permit this without increasing the total weight.

The assumption as to weight remaining unaltered is therefore reasonable. The new wings, which are assumed to be reduced throughout to scale, should have exactly the same L/D at 56 m.p.h. as the originals at 40.

The thrust required by the wings is therefore the same as before—that is 20 lbs. The body resistance however is a different matter. If the whole had been reduced to the same scale as the wings, the whole machine would have exactly the same resistance at 56 m.p.h. as the original had at 40 m.p.h.

The Effect of the Body.

But if the " Wren's " body were reduced to 70 per cent. of the original size it would not contain the pilot. Obviously on any machine one will fit the smallest body which will reasonably contain and streamline a man, and so far as cross-section is concerned the body size will not alter with the wing dimensions.

If the body remained identical in the two machines, the body resistance at 56 m.p.h. will be double that at 40 m.p.h. or 13.4 lbs. The total thrust therefore will increase from 26.7 to 33.4 lbs. and the theoretical air mileage will drop to 78 per cent. of that of the original design. Actually one should be able to save a little by shortening or decreasing the tail and get to 80 per cent. or a little more of the theoretical air mileage. Against this loss of 80 per cent. in theoretical air mileage one must put the higher ratio of ground mileage to air mileage which the higher speed will produce in anything but a dead calm, and any improvement in the efficiency of the combined engine and airscrew which may result from the higher speed of flight. For competition purposes it would probably be found that there was very little to choose between the two machines. For practical touring purposes there is very little doubt that the faster machine would have a better all-round economy.

Increasing Aspect Ratio.

One might increase the loading in other ways. Instead of decreasing span and chord together, one might fit the faster machine with wings of a higher aspect ratio, which should have a better L/D, and so will tend to counteract the effect of increased body resistance at the higher speed.

If one kept the same span, halved the chord, and doubled the aspect ratio the L/D ratio of the wings at the same lift coefficient should be increased to about 22.4 by this change, bringing the wing drag down to about 16.4 lbs. With the body resistance at 13.4 lbs. this brings the thrust to 29.8 lbs.—still giving a higher thrust than the original, and a lower theoretical air mileage. The reduction however in this case is only to 90 per cent. of the original, and would be pretty certainly wiped out by the practical gain of ground mileage due to the increased speed.

Theoretically wings of equal span carrying the same load should be of equal weight. Practically this would mean in the faster machine thickening the wing section to allow spars of the same depth as those of the original of twice the chord. One could, and would, thicken the section in the centre to some extent but the spars of the machine of reduced chord would be heavier than those of the original. On the other hand ribs would be shorter—and lighter, and covering would weigh less, and there should be no very great increase in wing weight. It would be possible still further to reduce the tail—and length of body—and the total structure weight ought not appreciably to increase. There would be no margin of any magnitude to allow for a larger engine, and therefore under the conditions assumed doubling the aspect ratio would probably not be justified, taking an all-round view.

Assuming that the weight can be kept to the original figure however in all three cases the theoretical air mileage per gallon of the three machines will be 155, 124, and 139.5 respectively.

The thrust h.p. required for the 40 m.p.h. machine will be 2.84 and by the 56 m.p.h. machines will be 5.1 and 4.5 respectively.

The theoretical air mileage assumes that all three engines use ½ pint of fuel per h.p. hour, and that all three airscrews develop 70 per cent. efficiency at the cruising speed. Actually it is improbable that an airscrew giving an efficiency as high as this, and delivering only 2.84 h.p. at 40 m.p.h. will be found practicable. Even assuming that it is so, it is somewhat unlikely that an engine can be persuaded to run for ½ pint per h.p. hour at only 4.1 B.H.P., which corresponds to 2.84 thrust h.p. at 70 per cent. efficiency. The probable consumption of a 400 c.c. engine throttled to 4 B.H.P. at 2,400 r.p.m. will not be much better than 0.65 to 0.70 pints per h.p. hour. This would bring the real air mileage per gallon down to between 110 and 120.

For 56 m.p.h. and 4½ to 5 thrust h.p. the achievement of 70 per cent. airscrew efficiency would probably be much easier. This means from 6½ to 7¼ B.H.P.—which is well within the capacity of a 400 c.c. engine, and would be developed at a much more efficient part of the engine's power range. If the consumption per h.p. hour under these conditions fell to .6 pint, the " air " mileage of the two faster machines would be 104 and 116 respectively.

In an out and home journey with and against a 10 m.h.p. wind, the 40 m.p.h. machine will cover only 37.5 miles of ground per hour. The 56 m.p.h. machine will cover 53.7 miles per hour. The ground miles per gallon of the 40 m.p.h. machine will be reduced by 6 per cent. to between 103 and 112, and that of the faster type by about 3½ per cent. to 100 and 111 in the two cases.

It will be obvious that there is a very large range of loading and speed within which the mileage practically attainable on a gallon of fuel is very nearly constant.

Actually it is believed that the above rough comparison of a low speed with a high speed machine is a little too favourable to the low-speed type.

"Body resistance" which has been used loosely to cover the whole difference between the actual resistance of the whole machine and the resistance deduced from model tests of the wings isolated from all other parts has been assumed to vary with the square of the speed. The effect of slip stream on this resistance may be expected if anything to fall as the speed increases. Also it is believed that the figure taken for this resistance—6.7 lbs. at 40 m.p.h.—is rather too high a proportion of the total resistance for a machine of this class.

And as this item of resistance is the only one which should increase with speed, the additional resistance due to increased speed has been somewhat exaggerated.

ENGINES FOR LIGHT AEROPLANES.

As there must be many persons contemplating the design and construction of light aeroplanes for the forthcoming competitions, it seems advisable to provide as much information as possible concerning the engines which are available for the purpose.

Under the rules of the contest engines are limited to a cylinder capacity of 750 c.c. and the engines must be of British manufacture. In addition to these definite rules it may safely be assumed that no one will seriously propose to use an engine of less than two cylinders.

For practical purposes therefore one is limited to two types —the horizontally opposed twin—or " flat twin " and the " Vee" twin, though there is at least one British four-cylinder aircooled engine within the 750 c.c. limit.

A further limitation in choice is the fact that so far as can be discovered the smallest two-cylinder type made is of about 350 c.c. capacity—which puts a lower limit to the engine size possible.

At the present moment an effort is being made to collect full data concerning all British engines which are eligible under the rules, and it is hoped to print a list of these engines and that data in the near future. There is however a certain amount of difficulty as to obtaining the required particulars. There seems to be a very considerable haziness—even on the part of the makers themselves, as to the power curves of their engines and as to their fuel consumptions. In addition figures for weight of engine are occasionally a little vague.

In connection with the question of power, it has to be remembered that there is a wide divergence between the performance of engines of the same make and type according to the work for which they have been tuned. A standard 500 c.c. engine, nominally of 3½ h.p. as fitted to the ordinary motor-cycle of commerce has its valve timing and carburetter adjusted to give a maximum torque and a best fuel economy at relatively low r.p.m. and to run evenly and pull well at quite slow speeds. In this condition it may develop a maximum h.p. of from 7-9 at an engine speed corresponding to pretty certainly not more than 60 m.p.h. of the cycle.

The same design of engine tuned up for high speeds, fitted with specially light pistons, probably with a higher compression, and run on a " doped " fuel, or an alcohol benzol mixture may develop over twice that h.p. at something well under twice the r.p.m. of its standard road-going brother on the racing track.

The racing engine would probably live for a very short while if one attempted to treat it as the average motor-cycle engine is treated on the road.

On the other hand the conditions encountered on an aero-

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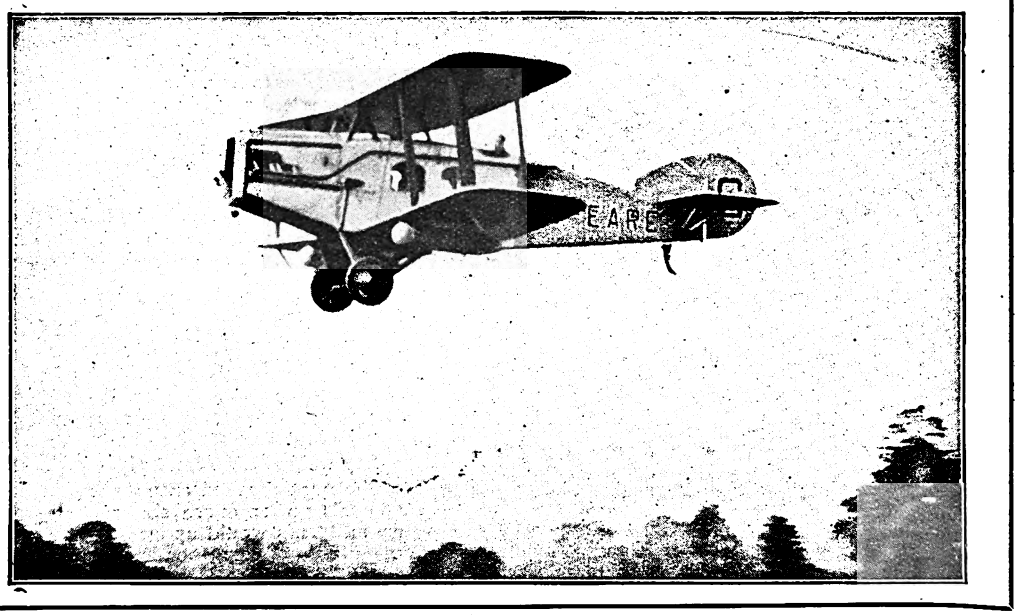

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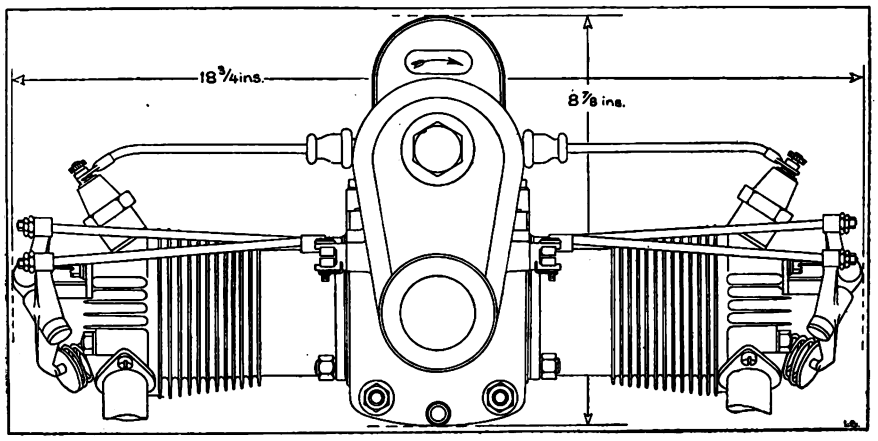

THE A.B.C. ENGINE.—This outline drawing which is to scale, shows the 3½ h.p. A.B.C. engine as it would be used for aeroplane work. The flange carrying the gear-case has been deleted. leted.

The two large bolts through the bottom of the crankcase provide a simple attachment for the engine-mounting.

These engines are no longer being manufactured but they can be obtained at widely varying prices from several firms which have laid in stocks of spare parts for A.B.C. motor-cycles.

plane driving a beautifully steady load in the shape of an airscrew, with nothing resembling the violent road shocks and changes of load and torque which are the lot of the motor-cycle engine tend to favour the "tuned-up" engine. In fact an engine which will survive an hour on full throttle on Brooklands would probably live quite a long time on a light aeroplane—even at full throttle.

Generally speaking the engine as tuned for racing will show a better fuel consumption per B.H.P. than will its more easily-run standard brother, provided that it is not unduly throttled down. Under aeroplane conditions it is probable that the effects of inertia forces at high r.p.m will be the most serious danger to the reliability of the motor-cycle engine. These forces are reduced by reducing the weight of reciprocating parts, and by keeping down the engine speed.

At the same r.p.m. the racing engine with its light pistons, etc., should actually be more reliable on this score than its more substantial brother. Its higher compression will give it a greater output and a lower fuel consumption.

Therefore it would seem that the best choice in this matter would be an engine more or less of the racing type, in so far as compression ratio and lightness of pistons, etc., are concerned, with valve and carburetter settings arranged to give the maximum B.M.E.P. at about ¾ of the R.P.M. of maximum possible output, and held down to this speed in flight by a suitably-designed airscrew.

If such an engine will run for an hour at its maximum h.p. in racing tune on the track, it should last almost indefinitely in the suggested tune in an aeroplane, for the inertia forces at full throttle will only be about ½ of those corresponding to racing r.p.m.

Also some such conditions will probably be found to give about the minimum fuel consumption at cruising speeds—which is a matter of the first importance.

In general it will be found that engine makers when they supply information in the ordinary course of business as to h.p. and fuel consumption of their engines do not state the conditions under which those figures are attainable. In some cases they are obviously very conservative figures and relate more or less closely to the average performance of a stock engine.

In other cases they appear to rush to the other extreme and give figures which can apply only to specially-selected and tuned engines under artificial conditions.

Intending purchasers of engines for light aeroplanes should therefore be very careful when making enquiries as to performance to discover precisely the conditions under which the performances quoted can be achieved.

THE A.B.C. 397 c.c. FLAT TWIN.

Both alphabetically, and in view of the fact that it is the first engine of its class which has actually flown an aeroplane in this country, the A.B.C. engine deserves first mention among those eligible for the forthcoming competition.

The engine—well-known to motor-cyclists—is of the flat twin type, with cylinders 69 m/m dia. × 54 m/m stroke—giving a cylinder capacity of 397 c.c.

The cylinders have steel barrels and cast-iron heads with overhead valves push-rod operated.

The crankshaft is very short and stiff—the length between bearings being less than one cylinder diameter, and it is entirely carried on ball-bearings. The big end bearings are of the roller type.

The crankcase is of aluminium, and has cast on to the end carrying the drive end of the crankshaft a large circular-flanged projection which is designed to carry the gear-box of the motor-cycle. As this projection passes well beyond the end of the crankshaft, it will require to be turned off in order to allow the mounting of an airscrew and boss.

At the other end of the crankshaft is a case containing the valve and magneto gear. The magneto is mounted on the top face of the crankcase.

A ball-thrust race is fitted to locate the crankshaft at the timing-gear end. It would be inadvisable to transmit the airscrew thrust through the crank however, and it will therefore be wise to fit a thrust to the drive-end of the shaft. There is fortunately ample room for such a thrust-race in the housing for the two crankshaft ball-races, if the existing distance piece between them is removed.

Another feature of the engine which requires alteration is the arrangement of inlet-pipes. These project forward and upwards from the cylinders, and the normal carburetter is fitted in the plane which will have to be occupied by the airscrew. It may be possible to make new induction-pipes to clear the airscrew, but it is probably quite possible to change over the exhaust and inlet valves.

The carburetter then comes behind and below the engine, and the exhaust valves face the airscrew.

The overall dimensions of the engine are approximately: Width over all (cylinder head to cylinder head), 19 in Height (crankcase to top of magneto), 9 in. Length over all (crankshaft drive-end to back of gear-case), 9 in.

The weight with inlet pipes and carburetter is about 40 lbs.

The normal rated output is 3½ h.p. at 2,000 r.p.m. and the maker's power curve shows a maximum of 7¼ h.p. at 4,500 r.p.m. This would appear to be a very conservative estimate of output—it corresponds to a B.M.E.P. of about 56 lbs. per sq. in. and there is no doubt that, with a little tuning the B.M.E.P. and the output could be increased by at least 50 per cent.

The petrol consumption—presumably at rated output, is said to be .56 pints per h.p. hour. The oil consumption is .035 pints per h.p. hour.

ENDURANCE TESTS.

The following letter has been received from D. Napier & Son Ltd. :—

"Sir :—In last week's copy of THE AEROPLANE when you referred to the Bristol 'Jupiter's' performance the following paragraph appeared :—

'Throughout the test an exhaust ring and long tail pipes were used, which in itself we believe to be a record for any endurance test for an aero engine.'

"We feel sure you will not mind our drawing your attention to the fact that it is not a record for an endurance test to be run as stated, as on the occasion when a 450 h.p. Napier Aero Engine was run for over 165 hours under official Air Ministry Observation the engine was fitted with long exhaust pipes.

"Reference was made to the test in THE AEROPLANE at the time, but I am sure you would like to correct the inference that it is usual to run an aero engine on these tests with open exhausts. At least this is not done with Napier Aero Engines that are tested.

"(Signed) For D. NAPIER & SON LTD.,
F. H. JONES."

SHOCK ABSORBERS.

In a recent issue of THE AEROPLANE reference was made to the special qualities of the rubber rings for shock absorbers produced by Luke Turner & Company Ltd. of Leicester. It will be remembered that this firm have specialised on shock absorber rings for the undercarriages of aircraft and have produced an entirely new type which has proved most efficacious in practice.

As the majority of aircraft firms are in the London district it will be of particular interest to the trade to know that the distributors of the aircraft productions of Luke Turner & Company Ltd. are Industrial Rubber Products Ltd., of 191-2, Tottenham Court Road, W.1, and inquiries from the Aircraft Trade will receive the promptest possible attention.

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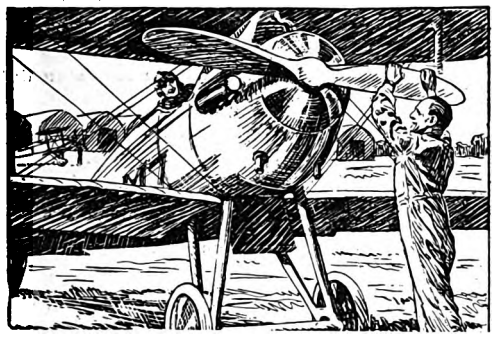

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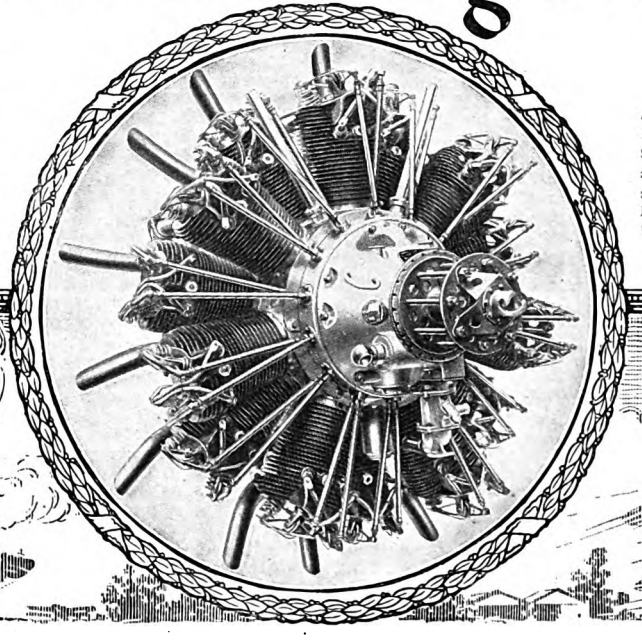

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R.A.F. INTELLIGENCE

Appointments.

Week ending May 14, 1923.

GENERAL DUTIES BRANCH.—Air/Cmdre. C. R. Samson, C.M.G., D.S.O., A.F.C., to Half-pay List, 12/5; C. J. Lambe, C.B., C.M.G., D.S.O., to Half-pay List, 1/3; A. E. Borton, C.B., C.M.G., D.S.O., A.F.C., to R.A.F. Depot, 7/4, on transfer to Home Establishment pending disposal.

Grp/Capt. N. D. K. MacEwen, C.M.G., D.S.O., to R.A.F., Trans-Jordania, H.Q., Palestone, 16/4, to command.

Wing/Cdrs. F. K. Haskins, D.S.C., to Supt. of Reserves H.Q., Northolt, 1/5, for duty as Superintendent of R.A.F. Reserves; I. T. Courtney, O.B.E., to R.A.F. Depot, 25/5, whilst attending course at Senior Officers' School, Woking; A. H. W. E. Wynn, O.B.E., to C. F. S., Upavon, 14/5, for Flying Refresher Course.

S/Ldrs. K. R. Park, M.C., D.F.C., to Aircraft Depot, Egypt, 5/5; I. J. E. Twistleton-Wykeham-Fiennes, to No 2 F.T.S., Duxford, 26/5.

F/Lts. M. Keegan, O.B.E., M.M, to M.T. Workshops and Pool, Palestine, 5/5; W. Underhill, D.S.C., to No. 4 F.T.S., Egypt, 5/5, for course of instruction; B. Ankers, D.C.M., to No. 1 F.T.S., Netheravon, 21/5; H. H. James, to R.A.F. Base, Calshot, 16/5; A. G. Taylor, A.F.C., to No. 1 F.T.S., Netheravon, 23/4; H. G. W. Lock, D.F.C., to No. 2 Squadron, S. Farnboro', 13/4; R. H. C. Usher, M.C., A.F.C., and C. V. A. Bucknall, to Supt. of Reserves, H.Q., Northolt, 1/5; A. P. Ledger, M.B.E., to No. 11 Sqdn., Andover, 4/5; H. H. Balfour, M.C., to Half-pay List, 25/4; A. G. Weir, to R.A.F., Staff College, Andover, 26/5.

F/Os. B. G. Drake, to H.Q., C.A., 1/5, for course of instruction in pay and stores accounting at Air Ministry; C. B. Bond, to R.A.F. Depot, 21/4, on transfer to Home Estab.; R. Lamb, to Noll Stores Depot, Kidbrooke, 30/4, for course of instruction; G. H. Harrison, D.F.C., to Boys' Wing, Cranwell, 7/5; (Hon F/Lt.) J. E. Catherall, M.B.E., to Supt. of Reserves, H.Q., Northolt, 1/5; J. Harston, to R.A.F. Depot, 1/5; J. N. Jacques and C. C. Musselwhite, to R.A.F. Depot, 15/5, whilst attending course at School of Army Co-operation, Old Sarum; D. R. Sharman, M.C., to School of Army Co-operation, 15/5, for course of instruction; V. F. R. Hill, to Air Ministry, 1/5; F. A. Pumphrey, D.C.M., to R.A.F. Depot, 4/5, on appointment to a S.S. Commission; L. D. Stewart, to H.M.S. *Pegasus*, 3/5; E. J. H. Wright, to 41 Sqdn., 14/5. B. J. O'Connor Hanstock, to 31 Sqdn., India, 15/4; J. B. L. H. Cordes, to 29 Sqdn., Duxford, 14/5; E. A. Sullock, A.F.C., to 19 Sqdn., Duxford, 14/5; A. A. N. D. Pentland, M.C., D.F.C., to R.A.F. Depot, 23/4, on appointment to a S.S. Commission and to Armament and Gunnery School, Eastchurch, 14/5; W. S. Watson, to R.A.F. Base, Leuchars, No. 440 Flight, 29/4; A. Sattin, to R.A.F. Depot, 9/5, on appointment to a S.S. Commn.

P/Os. C. J. Stone, to C.F.S., Upavon, 8/5, for course of instruction; I. K. Barnes, to R.A.F. Base, Leuchars (No 401 Flight), 8/5; B. R. C. Coope, F. W. M. Downer, M. C. W. C. Flint, M.C., D. McG. Morphy, I. G. Pinnell and R. G. Chapell, to R.A.F. Depot, 15/5, whilst attending course at School of Army Co-operation, Old Sarum; G. E. Nicholetts, to R.A.F. Base, Leuchars, No. 440 Flight, 29/4.

MEDICAL BRANCH.—F/Lts. (Medical) T. Sheehan, to H.Q., C.A., 7/5; E. D. D. Dickson, M.B., F.R.C.S., to Research Lab., and M.O., S. of I., Hampstead, 2/5, on appointment to a S.S. Commission; K. R. Smith, M.D., D.P.H., to H.Q., C.A., 7/5; R. S. Topham, M.B., D.P.H., to R.A.F. Central Hospital, Finchley, 9/5; H. H. R. Bayley, to R.A.F. Depot, 14/5; E. D. D. Dickson, M.B., F.R.C.S. (E), to No. 1 S. of T.T. (Boys), Halton, 14/5, as M.O. at R.A.F. Hospital.

F/Os. (Medical) J. B. Gregor, to Research Lab. a, d, M.O., S. of I., 30/4, on appointment to a S.S. Commission.

STORES AND ACCOUNTANTS BRANCH.—F/Lts. (Stores) D. W. Wilson, to Engine Repair Depot, Egypt, 5/5; J. L. Denham, to Aircraft Depot, Egypt, 5/5; K. D. G. Collier, to H.Q., R.A.F., India, 17/4.

F/Os. (Stores) E. W. Husband, to 47 Sqdn., Egypt, 5/5; H. Jones, to 41 Sqdn., Northolt, 4/5; D. Barron, to 56 Sqdn., Hawkinge, 3/5; A. McC. Goddard, to School of T.T. (Men), Manston, 4/5; (Accts.) L. J. Marden, to Supt. of Reserves, H.Q., Northolt, 1/5; W. C. Farley, to R.A.F. Base, Gosport, 15/5

P/Os. (Accts.) R. W. Freeman and F. C. Langley, to H.Q., C.A., 26/4; E. C. Green, F. M. Hall and J. H. S. Richards, to H.Q., C.A., 1/5, all on appointment to S.S. Commissions for course of instruction in pay and stores accounting at the Air Ministry; G. Bucknall, J. H. P. Clarke, R. A. Dolton, A. J. Grant, F. C. C. B. Hichens, N. W. Law and F. A. R. Smith, to No. 1 Stores Depot, Kidbrooke, 2/5, for course of instruction on appointment to S.S. Commissions.

CHAPLAINS BRANCH.—The Rev. C. O. R. Wormald, M.A., to No. 5 F.T.S., Shotwick, 16/4, on appointment to a S.S. Commission.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

THE IMPERIAL SERVICES BOXING CHAMPIONSHIP.

The Services Championship Meeting took place in the Maida Drill Hall, Aldershot, on May 10 and 11. The final positions of the Services were: R.N. 32 points, Army 32 points, R.A.F. 28 points and R.M. 22 points.

The following are the results:—

OFFICERS.

FEATHER-WEIGHTS.—F/Lt. H. E. Walker (R.A.F.) beat Lt. S. O Boyd (Army) on points; S/Lt. A. E. Westcott (R.M.) beat Lt. W. Haynes (R.N.) on points; S/Lt. A. E. Westcott beat F/Lt. Walker on points

LIGHT-WEIGHTS:—Lt. H. A. Spencer (Army) beat S/Lt. S. C. Woolley (R.M.) in the first round; F/O. L. Whitfield (R.A.F.) beat Lt. J. Hill (R.N.) in the first round; Lt. H. A. Spencer (holder) beat F/O. L. Whitfield in the second round.

WELTER-WEIGHTS:—Mr. W. Paige Gunner (R.N.) beat F/O. MacGregor (R.A.F.) on points after an extra round; Lt. A. Jarman (Army) beat S/Lt. J. O. G. Hayter (R.M.) on points; Lt. A. J. Jarman beat Mr. W. Paige Gunner on points.

CATCH-WEIGHTS:—Lt. C. F. Capper (Army) beat Lt. C. F. Hallaran (R.N) on points. P/O C. W. A. Scott (R.A.F.) a bye; Lt. C. L. Capper beat P/O. C. W. A. Scott in first round.

MIDDLE-WEIGHTS:—Lt. W. Schoales (Army) beat F/O. A. J. Adams (R.A.F.) in the second round; Capt. A. D. C. Shephard (R.M.) beat Lt. D. Orr-Ewing (R.N.) on points; Capt. A. D. C. Shephard beat Lt. W. Schoales on points.

OTHER RANKS.

FLY-WEIGHTS:—L/Cpl. Johns (Army) beat A.C.2 Mayes (R.A.F.) in the second round; O/S Harrod (R.N.) beat Bugler Coles (R.M.) early in the first round; L/Cpl. Johns beat O/S. Harrod (holder) on points.

BANTAM-WEIGHTS:—L/S. Patten (R.N.) beat A.C.2 Davies (R.A.F.), who retired injured in the second round; L/Cpl. Harvey (Army) beat Cpl. Hayes (R.M.) on points; L/Cpl. Harvey beat L/S. Patten on points

FEATHER-WEIGHTS:—L/A.C. J. H. Boteler (R.A.F.) beat A. B. A. Boon (R.N.) in the first round; St/Inst. W. Hoban (Army) beat Cpl. Cawthra (R.M.) on points; St/Inst. Hoban beat L/A.C. Boteler on points.

LIGHT-WEIGHTS:—Cpl. Downton (R.M.) beat C.Q.M.S. Cunningham (Army), who was disqualified in the third round for holding; S/P.O. Cartledge (R.N.) beat St. Salter (R.A.F.) in the second round; S/P.O. Cartledge beat Cpl. Downton on points.

CATCH-WEIGHTS:—A.C.2 Hankinson (R.A.F.) beat Pte. Mottram (R.M.) in the first round; S/P.O. Spiller (R.N.) beat Pte. Taylor (Army) in the second round; A.C.2 Hankinson beat S/P.O. Spiller in the second round.

WELTER-WEIGHTS:—A/S. W. Dickson (R.N.) beat L/Cpl. Mahoney (Army) on points; A.C.2 Bill (R.A.F.) beat Cpl. Davey (R.M.) in the first round; A.C.2 Bill beat A/S. Dickson on points.

MIDDLE-WEIGHTS:—Cpl. Higgins (R.A.F.) (holder) beat Piddock (R.M.) on points; A/S. Larby (R.N.) beat St. Crawley (Army) in the second round. A/S. Larby beat Cpl. Higgins (holder) on points.

LIGHT HEAVY-WEIGHTS:—Gnr. Hornsey (R.M.) beat A. C. Williams (R.A.F) in the third round; Stkr. Miller (R.N.) (holder) beat Bdr. Griffen (Army) on points; Stkr. Miller (holder) beat Gnr. Hornsey on points.

NOTE.—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

PERSONAL NOTICES.

DEATHS.

DAVIES.—On May 2, at Blackheath, Langford George Davies, M.A., M.B., B.C. (Cambridge), M.R.C.S., L.R.C.P. (England), late R.A.M.C. and R.A.F., of 109, Shooters Hill Road, Blackheath, only surviving son of J. H. W. Davies, 25, St. John's Park, Blackheath, S.E., aged 42.

EDWARDS.—On May 9, as the result of an operation, Sheila, the youngest daughter of Lt./Col. Ivo Edwards (late R.A. and R.F.C.) and Mrs. Edwards, of 56, Buckingham Gate, S.W.1.

GOSSIP.—On Apr. 24, at Constantinople, as the result of a flying accident, George Hatfield Dingley Gossip, F/O., 56, Sqd. (Detached flight), R.A.F.

HARRIS—On Apr. 24, at Spittlegate, near Grantham, Lincs, as the result of a flying accident, Frederic Samuel Harris, P/O., 39, Sqd., R.A.F.

STREET.—On Apr. 21, 1923, at Constantinople, of double pneumonia, F/Lt. Harold Wilbert Street, M.B., R.A.F.M.S.

STRUBEN.—On Apr. 16, at Letchworth Hospital, the result of an accident, Alexander B. Struben, of Pembroke College, Cambridge, eldest surviving son of Maj. Arthur Struben, late R.A.F.

TRENCH.—On Apr. 24, at Spittlegate, near Grantham, Lincs., as the result of a flying accident, Frederic Samuel Harris, P/O., 39 Sqd., R.A.F.

MARRIAGES.

de BURGH—USHER.—On Apr. 30, 1923, Edinburgh, F/O. Ulric Campbell de Burgh, R.A.F., late R.N. (retd.), younger son of the late Hugo de Burgh, of Ballinapierce, and Mrs. Gerald Dunne, of Black Hall, Sallins, Co. Kildare, Ireland, to Kathleen, younger daughter of Mr. and Mrs. George Usher, of 16, Grosvenor Crescent, Edinburgh.

HARKER—IVIMEY.—On Apr. 28, at St. Peter's, Belsize Park, Mark Adamson Harker, F/Lt., R.A.F., second son of Mr. and Mrs. Harker, of Boswall-on-Dee, to Edith Frances, daughter of Dr. John and Mrs. Ivimey, 7, Lancaster Road, Belsize Park, London, N.W.

SLESSOR—CARTER.—On May 8, at St. Peter's, Eaton Square, F/Lt. J. C. Slessor, M.C., R.A.F., to Hermione Grace Carter.

BIRTHS.

BLACKBURN.—On May 8, at Henlow, to the wife of Wing/Cmdr. H. Blackburn, M.C., A.F.C.—a daughter.

BOYD.—On Apr. 20, at Ingthorpe, Twyndham Road, Southbourne, to Marjorie (*née* Tudor), wife of Wing/Cmdr. O. T. Boyd, R.A.F.—a son. (Argentine papers, please copy.)

CLARK HALL.—On May 1, at Eastfield, Weyhill, Andover, the wife of Air/Cmdre. R. H. Clark Hall—a daughter

DARWIN.—On May 2, 1923, at 17, Norfolk Crescent, W., the wife of F/Lt. C. C. J. W. Darwin—a daughter.

DORE.—On May 9, at Hampstead, to Miele, wife of Lt./Col. Alan Dore, D.S.O., M.A. (late R.A.F.)—a daughter.

ELLWOOD.—On Apr. 17, at 136, The Mall, Peshawar, India, to Lesley, wife of F/O. Aubrey B. Ellwood, D.S.C., R.A.F.—a son.

McKINNON WOOD.—On May 9, at "Redriff," Farnborough Park, Hants, to Mr. and Mrs. Ronald McKinnon Wood—a daughter.

PENNINGTON.—On Apr. 30, at Ravenswood, Newcastle-on-Tyne, Sheila, the wife of F/O. G. R. Pennington, R.A.F.,—a daughter.

WARING.—On May 14, to Jean and Rupert Thomas Tremayne Waring, at 23, Drayton Gardens, Kensington—a son.

WILKINS.—On Apr. 21, at Highover, Westerham, Kent, to Margaret (Peggie), wife of Major L. Howard Wilkins, D.S.C., late of R.A.F.—a daughter.

WILLIAMSON.—On Apr. 27, at St. Clement's Nursing Home, to Lucie, wife of F/Lt. J. J. Williamson, A.F.C., R.A.F., a son.

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ESTABLISHED 1912.

SUPERMARINE

ENGLAND

DESIGNERS AND CONSTRUCTORS OF NAVAL FLYING BOATS AND NAVAL AMPHIBIAN FLYING BOATS.

CONTRACTORS TO
H.M. ADMIRALTY, H.M. AIR MINISTRY, THE IMPERIAL JAPANESE NAVY, THE ROYAL NORWEGIAN NAVY, THE ROYAL SWEDISH NAVY, THE SPANISH ROYAL NAVAL AIR SERVICE, THE CHILIAN NAVY, THE PORTUGUESE NAVY, AND OTHER FOREIGN GOVERNMENTS.

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World's Fastest Flying Boat

WE CLAIM THESE FACTS

"A SEAWORTHY HULL THAT WILL FLY."

Originators of Circular Hull Construction.

The longest experience of FLYING BOAT building in this Country—11 years.
The best speed performance of FLYING BOATS in 1917—100 M.P.H.
The best speed performance of FLYING BOATS in 1918—118 M.P.H.
The best speed performance of FLYING BOATS in 1919—147 M.P.H.
Originators of the first Amphibian FLYING BOAT SCOUT in 1921.—This type of machine won the Schneider Cup, establishing world's records in 1922—163 M.P.H.

We produced the first English Commercial FLYING BOAT—1919.
We produced and ran the first British Commercial FLYING BOAT SERVICE—1919.
We established the first International Commercial FLYING BOAT service—England to France, 1919.
We hold the first commercial Flying Boat Certificate of Airworthiness issued by H.M. Air Ministry.
We were awarded the second prize of £4,000 in the Air Ministry's Competition for AMPHIBIANS, 1920, which was increased to £8,000 in recognition of the general excellence of design and construction of the Supermarine Amphibian Flying Boat. This was the only machine to accomplish all the tests and that had no breakages during the trials.
We produced the first specially designed Deck-landing Flying Boat, 1921.
We hold the first official world's records granted by the F.A.I. for Marine Aircraft—duration of 1 hr., 34 mins., 51⅘ secs. Longest distance accomplished 230 miles. Fastest time for 100 kilometres = 62 miles, 28 mins., 41⅗ secs. Fastest time for 200 kilometres = 124 miles, 57 mins., 37⅘ secs.—1922.

WINNER

of the International Race for the

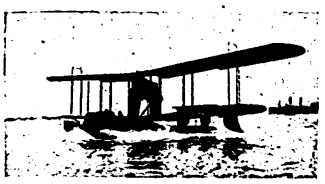
SCHNEIDER CUP

NAPLES, AUGUST, 1922.

WE HAVE BEEN ENTRUSTED BY THE BRITISH AIR MINISTRY WITH THE DESIGN AND CONSTRUCTION OF THE LARGEST FLYING BOAT ORDERED BY THEM SINCE THE WAR.

ALSO WITH THE DESIGN AND CONSTRUCTION OF THE FIRST DOUBLE-ENGINED AMPHIBIAN FLYING BOAT TO BE ORDERED IN THE BRITISH EMPIRE

... adv't



"CHANNEL TYPE" SCHOOL MACHINE
240 h.p. Puma.

COMMERCIAL AMPHIBIAN FLYING BOAT, MK. I.
360 h.p. Rolls-Royce.

"SEA EAGLE" 8-SEATER COMMERCIAL AMPHIBIAN.
360 h.p Rolls Royce Eagle IX.

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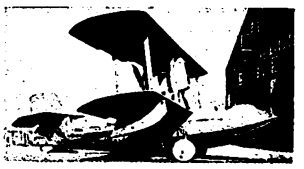
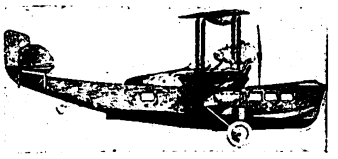


"SEA LION II" SINGLE SEATER AMPHIBIAN.
450 h.p. Napier Lion. Winner of the International Race for the Schneider Cup at Naples, 1922.

"SEAGULL" AMPHIBIAN MACHINE.
450 h.p. Napier Lion.



TWIN-ENGINED COMMERCIAL AMPHIBIAN TO CARRY 12 PASSENGERS AND LUGGAGE WITH CREW OF 2.
Two 360 h.p. Rolls-Royce Eagle IXs.

REGISTERED OFFICES AND WORKS:
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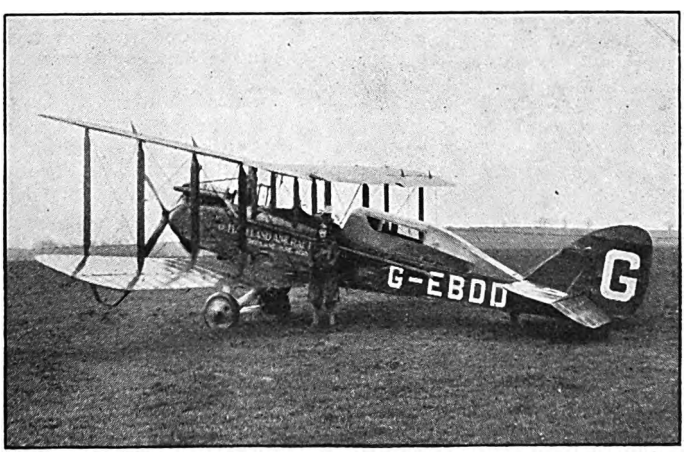
ENGLAND.
FLYING WATER AND SLIPWAY: WOOLSTON.

DE HAVILLAND AEROPLANES.



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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.
ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 19; Tuesday, 19; Wednesday, 20; Thursday, 15; Friday, 15; Saturday, 18; Sunday, 3

LONDON—PARIS:

Handley Page Transport, Ltd., machines 22, passengers 187, freight 6,436 lbs.; Air Union, machines 20†, passengers 56, freight, 24,925 lbs.; Total machines 42, passengers 243.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 20*, passengers 88, freight —.

MANCHESTER—LONDON—AMSTERDAM—BERLIN:

Daimler Airway, machines 30, passengers 76, freight —.

LONDON—ROTTERDAM:

K.L.M., machines 10, passengers 19, freight —.

SPECIAL MACHINES:

De Havilland Hire Service, machines 6, passengers 4.

Armstrong-Whitworth, Ltd., one "Siskin" to Spain.

Total number of trips by British machines: 79, carrying 355 pas. Foreign machines: 30, carrying 75 pas.

STATISTICS.

For week ending May 13:—

Machines, 109; Passengers, 430; Crews, 179; Total Personnel, 609.

Corresponding week last year:—

Machines, 162; Passengers, 261; Crews, 207; Total Personnel, 468.

Corresponding week, 1921:—

Machines, 82; Passengers, 313; Crews, 101; Total Personnel, 414.

Corresponding week, 1920:—

Machines, 75; Passengers, 165; Crews, 87; Personnel, 250.

* These machines also carry loads of freight.

† Some machines are freighters only. The Air Union runs an early morning machine carrying newspapers daily from Lympne to Paris.

Croydon Notes.

The number of passengers still maintains a high level though bad weather has caused the total to drop slightly below that of last week.

Handley Page Transport Ltd. carried 187 passengers. They have not yet decided on their new pilot. The original W.8 is doing well with the Rolls-Royce engine and makes good time on the Paris route. On Thursday she made the trip in two hours four minutes in spite of the fact that when she disappeared out of sight she was heading straight for the Crystal Palace. She seems fond of that structure as one saw her again over the Palace on Saturday on her return from Paris. There was a snowstorm in full working order at the time.

Handley Page Transport Ltd. recently had a letter from a correspondent in Texas who addressed them as the "Handley Page Motor Bus Co., London, England." The letter was safely delivered. The Postal Authorities evidently knew that Tennyson was right when he remarked that "Coming events cast their shadows before them."

[One doesn't believe that Tennyson said anything of the sort. But he did say something about "aerial argosies" or words to that effect.—C. G. G.]

The Instone Air Line began a non-stop service to Cologne on Monday of this week. Machines leave Croydon daily at 10.00 hrs. and arrive at Cologne at 13.30 hrs. After a stay of two hours the same machine will leave Cologne at 15.30 hrs. and is due at Croydon at 19.00 hrs. The service to Brussels will run as usual. It is noteworthy that all the British machines running to Germany are of De Havilland design with Napier engines.

The number of passengers on all the services to Germany is remarkably high.

Owing to the lack of support given to the Manchester service the Daimler Airway are considering running to Liverpool instead.

Lt.-Col. G. L. P. Henderson flew the Surrey Flying Services L.H.9, by arrangement with the Instone Air Line on a further mail-carrying experimental expedition. He completed a circuit from Croydon via Plymouth and Manchester in six hours' flying. A special note on this flight appears elsewhere.

The Surrey Flying Services are in need of two more pilots at once. Mr. Hayden has gone to Portsmouth where he is in charge of joy-riding for the S.F.S. Another machine is to go to Yarmouth.

Mr. Frank Courtney passed through the Aerodrome on Wednesday on a Siddeley "Siskin" *en route* for Spain where where he will give demonstrations. He reached Paris in one hour and fifty-five minutes. He did some very pretty flying with the machine before leaving.

The Trust House opens its new premises on Saturday this week. The big dining-room has been decorated very prettily in purple and lemon. The Palm Court will not be completed until the autumn. Outside tea-tables will be a feature of the new place.

Mr. Lloyd has gone to endless trouble to make the place comfortable and the service now is most efficient. Old members of the Aerodrome will hardly recognise the new place as the outcome of the old and at-one-time-not-at-all-that-could-be-desired Trust House.

The improvements to the aerodrome are proceeding with the alacrity of the proverbial tortoise.

The latest rumour in connection with the Million Pound Company is that it is to be a Pontifical Command.—G. D

The Retort Disconcerting.

[The following letter from the English representative of the K.L.M. deserves the fullest consideration as an example of tact, diplomacy and humour. He and G. D. had better settle the rest of the argument in person.—C. G. G.]

"Sir,—May I be allowed to pick a small bicker with your Mr. G. D. regarding his article entitled "By Motor Glider to Amsterdam," of your issue of May 10, 1923.

"Ignoring the frivolous and malicious attack made upon the K.L.M. ground organisation of both Rotterdam and Amsterdam Aerodromes, because my colleagues over there are perfectly capable of dealing with it in the correct manner, *i.e.*, by ignoring it as totally unimportant, I should like to point out how thoroughly clumsy and inartistic the whole thing appears to be. Mr. G. D. so very obviously set out on his joy-ride with a peevish determination to find fault with everything Dutch, from the first windmill to the last dyke, that he not only weakens his attack by his very venom, but also gives the impression that some outside influence had on this occasion given his massive intellect a distinctly anti-Dutch and especially anti-K.L.M. bias.

"Almost the only Dutch thing Mr. G. D. had any use for apparently was the restaurant at Schiphol Aerodrome. Did he, however, realise at the time of writing that both Rotterdam and Amsterdam restaurants are entirely run by K.L.M?

"I should be extremely annoyed, the position being reversed, if a Dutch journalist having been the guest of K.L.M., were to return to Holland and pour forth a mass of inky invective against the firm with whom we are in co-operation because:—

"(1) It would then appear that I could not settle any minor difficulties of co-operation without assistance from the said journalist to the extent of a full-page article.

"(2) It would put me in such a position that I might reasonably be suspected of being so lost to all sense of common decency as to have encouraged a petty and underhand attack upon an allied firm, in regard to matters which obviously should be settled in private.

"(3) It would naturally tend to increase the difficulty of co-operation between two firms of different nationalities.

"Lest I should be accused of taking Mr. G. D. and his amusing little article too seriously let me say, in conclusion, that, though I don't know the nursery rhyme in question, I conceive it possible that next time Mr. G. D. descends, glorious in his little Norfolk jacket, from the prow of a "splendid" D.H.34 upon that much overrated Aerodrome of Rotterdam (see cover of THE AEROPLANE for Wednesday July 12 1922) he may be accorded the Civic welcome he so richly deserves from "The Hotter Lot in Rotterdam" who unfortunately failed him on his last visit.

(Signed for the Royal Dutch Air Service),
H. SPRY LEVERTON (Aerodrome Manager).

[The object of my visit to Holland was purely to take the air and not with malice aforethought. I wrote of what I saw on that day and was not biased either one way or the other. "The mass of inky invective" against the K.L.M. was but a line or two. It would seem that tears of blood had somewhat clouded Mr. Leverton's vision so that it made him see even more than double.

I am perfectly willing to believe that Holland is an excellent place. I but wrote of the manners and customs of the

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K.L.M. as seen by me on that particular day. Perhaps there was a reason for these manners and customs. Who knows?

With regard to the café, I certainly congratulate the K.L.M. on this. They produce most excellent iced orangeade, an ideal drink for such a hot day.—G. D.

The Tempest.

Mr. Alan J. Cobham is making a bold bid for the title of the "Aerial Douglas Fairbanks." His escapades in the air as reported in the Daily Press recently get "thrillinger and thrillinger" every edition.

He met his friend the wonder-cloud again last week when returning from Rome. This cloud will probably become his own property if he wins against it again, that is to say three times in all. It waits for him over the top of a gorge and when he reaches the narrowest part it closes down. So far Mr. Cobham has always got through with about a foot to spare and is now two up on the cloud.

Mr. Cobham is an excellent air propagandist but he really should be careful not to make flying too terrifying or he will frighten away possible travellers.

The *Daily Mirror* seems to be about to start a "Hats off to Cobham" movement as the result of his fine flight from Rome. One trusts that this will not prove too much for the readers of that periodical who have already contracted severe colds from continually taking off their hats to France.—G. D.

Measure for Measure.

In view of the prominence now being given to the avionette, motor-glider, aero-scooter or whatever one likes to call it, some of the performances of Mr. Bert Hinkler on the Baby Avro with 35 h.p. Green engine are worth recalling.

The non-stop flight from Croydon to Turin, some 800 miles on 20 gallons of petrol, is still remembered by all, as is the subsequent flight on to Rome and back to Croydon and Southampton. Then the same machine in Australia flew from Sydney to Bundaburg non-stop using less than 20 gallons of petrol for the 850 miles.

On the two-seater Baby in England Mr. Hinkler with his wife as passenger flew from Southampton to Martlesham on five gallons of petrol in two hours. Flying round in the neighbourhood of Hamble throttled down at about 50 m.p.h. Mr. Hinkler uses about one gallon per hour. During these performances the machine has been carrying enough petrol for seven or eight hours.

The Green is by no means a light-weight having a capacity of more than 4,000 c.c. The avionette of course scores in initial cost which is about £150 compared to the £800 for the Baby "Avro."

One understands that an "Avronette" or "Infra-Baby" Avro is now in course of development.—G. D.

Our Air Uncles.

The band of the Royal Air Force under the direction of "Uncle" Flight Lieut. J. H. Amers has broadcast from time to time from the London Station of the British Broadcasting Company, by permission of the Air Council.

It is noteworthy that the R.A.F. band have declined to recognise the silly boycott which most musical associations have placed on bands and artists who broadcast—and have consequently had several contracts cancelled.

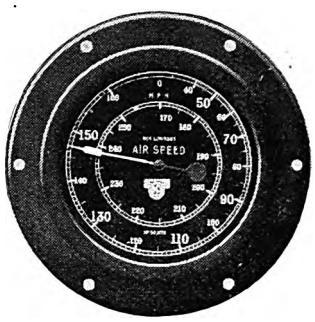
It is refreshing to see that the trade union system is not countenanced in the R.A.F. even though it appears to be permissible in bands of the Army.

Last (Tuesday) night, while this paper was printing, Sir Samuel Hoare, the Air Minister was to broadcast a speech from the London Station on the Air Defence of London.

Our "Uncle Sam" is nothing like as dry as is his trans-Atlantic name-sake so one feels sure that his hearers enjoyed his discourse.—G. D.

Delivery ex Stock. *Price Also Right.*
FREDK. MOUNTFORD (BIRM.) LIMITED,
Fremo Works, Moseley Street, BIRMINGHAM.

Instrument Chats
(No. 2.)



Pilots of racing machines need not guess their speed to-day, the Smith Airspeed Indicator indicating any velocity up to 250 m.p.h. or corresponding kilometres. There is also a special low reading instrument (10 to 80 m.p.h.) specially built for Gliders and light planes. Full particulars of all models free on request.

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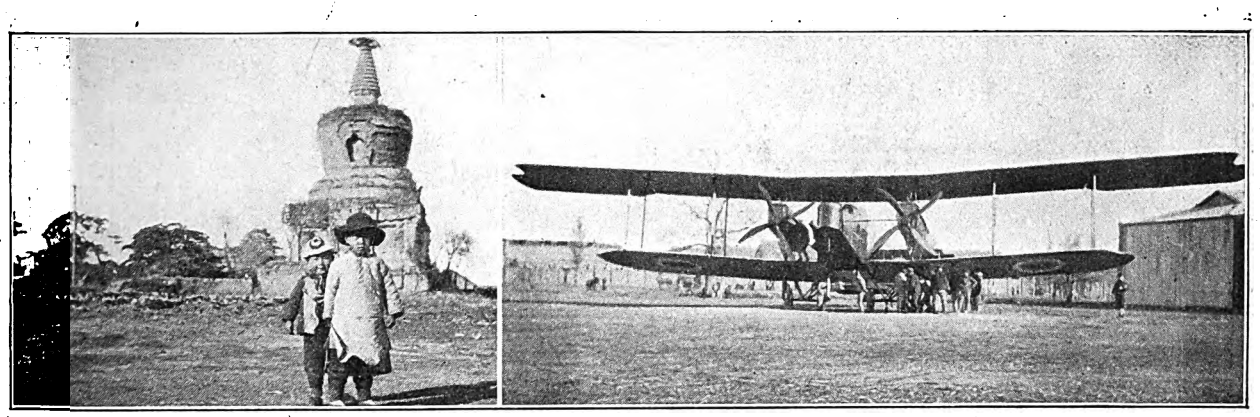
THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, MAY 23, 1923.

Vol. XXIV. No. 21. SIXPENCE WEEKLY. [Registered at the G.P.O. as a Newspaper.

"THROUGH ALL THE CHANGING SCENES OF LIFE."



UNCHANGING CHINA:—Two photographs taken by Lieut.-Colonel F. A. G. Noël from the same spot on Mukden Aerodrome by merely turning round. The Chinese tomb is believed to be older than the 0'400 Handley Page, though in Chinese hands there seems to be little difference in their mobility.

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MAY 23. 1923.

THE AEROPLANE

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ON ENLARGING THE ROYAL AIR FORCE.

A Slight Explanation.

That being so one may perhaps now permit oneself to make a few comments on the speeches of the noble Lords. It is apparently necessary to make it very clear that these are one's own comments, for after an article in THE AEROPLANE on Mar. 21 in which one interpolated sundry remarks into a speech which Sir Samuel Hoare made on Mar. 14 a M. Georges Houard, writing in *Les Ailes* which is one of the leading French aircraft papers, informed the French nation in large type that "*Monsieur C. G. Grey n'est pas l'Angleterre.*" It seems that one of the French sporting papers had read the article on Mar. 21 with much interest and a certain amount of misapprehension and becoming a trifle mixed over the intricacies of the English language had attributed to Sir Samuel Hoare certain sentiments which were merely those of C. G. Grey.

These remarks, which certainly indicated English aeronautical feeling with considerable accuracy, were undoubtedly not such as would have been used by a Minister of the Crown officially no matter what he might think personally. Briefly they were one's personal opinion that we need not worry much about the big French Air Force because knowing something of French ideas of organisation we knew perfectly well that a comparatively small portion of that Air Force would ever be able to get off the ground at the same time and that although the French have vast quantities of excellent fighting machines they would have great difficulty in finding pilots for them.

One pointed out that it was quite possible that in a moment of arrogance France might be foolish enough to attack England. Such things have happened in the past and might happen again. At any rate one has to prepare for such an eventuality. Also one remarked that any nation is liable to tear up a treaty like any other piece of paper. The waste-paper-basket of history is full of torn treaties.

These unpalatable truths roused the wrath of M. Houard who in *Les Ailes* remarked that "in THE AEROPLANE the Francophobia of the author gives itself free course." One can assure M. Houard that one is not a Francophobe and that those Service people who recognise that some day we may have to fight France are not Francophobes. M. Houard does not seem to appreciate the fact that the Greek word "phobos" means "dread" or "fear" and not "hatred" or even mere "dislike."

Very few people in England dislike French people individually. Personally one has a large number of French friends of whom one thinks most highly. But one has no more respect for or trust in French politicians than one has for or in English politicians. And certainly nobody in this country has any fear of France. We have fought the French far too many times and for too many centuries to be in the least afraid of them. To their credit be it said the French have always put up a very good fight but they have never beaten us and they are never likely to do so, least of all at sea or in the air. Therefore Franco*phobia* is quite the wrong word to use in this connection.

French Foolishness.

One is not even anti-French. But one disapproves heartily of many actions of the French Government. For example one gathers from highly intelligent friends, some of whom have been special correspondents of violently pro-French journals, that French methods in the Ruhr if not actually calculated to drive the Germans to frantic retaliation are at any rate such as to lead inevitably to riots and rebellion. There is a most remarkable contrast between the entire friendliness with which the Germans regard the English in the English zone of occupation and the hatred of the French into which they are driven in the French zone.

It is true that in this case one does not represent English opinion for the very good and sufficient reason that English opinion is doped by a foolishly pro-French Press. In any case the ordinary Englishman does not care two hoots how many Frenchmen or how many Germans kill one another in the Ruhr any more than he cares how many Irish Republicans and how many Irish Free Staters kill one another in Ireland.

On one point however M. Georges Houard makes a mistake in his misapprehension of the English language on which he must be corrected. He attributes to one the opinion that "there is no reason why Great Britain should not be called upon to fight France rather than any other nation except Russia." Actually what one said was,—"We are just as likely to fight France within the next ten years as we are to fight any other nation in the World except Russia." What one meant was that there is always the possibility that we *may* have to fight any nation in the World, including France, but that inevitably we shall have to fight Russia.

So far from denying the possibility of a conflict with Russia one is perfectly certain that we shall have to fight Russia, and one is very wide awake "to the powerful and redoubtable organisation of Sovietic aviation" as M. Houard calls it. The fact that Russian aviation is being reorganised as it is by German engineers and German aviators is largely due to the fact that the powerful French influence in the *Commission Aéronautique Inter-Alliée* has broken up the German aircraft industry and, as already suggested, in the days to come when our Air Force has to fight Russian aviators on machines designed and built by Germans they will not forget that the French are to blame for it.

Un-Common Sense.

With things as they are it is certainly well that Lord Birkenhead should remind the World that friendships are not unestrangeable and that we should have a perfect right to guarantee absolute security to this country. The One-Power standard advocated by Lord Birkenhead seems quite adequate. France at present is so far ahead of all other Powers, at any rate in the numbers of her aircraft, that if we have within the next few years an Air Force as big as that of France we shall certainly be immensely superior to anybody else in the World, including France. Moreover the equipping of an Air Force as big as that of France will establish in this country an Aircraft Industry which will be financially sound and organised on such a scale as to be capable of expanding its production in a very short time to any desired extent.

Of course it is necessary to remember that in building up an Air Force to the French standard our politicians will most certainly include our naval aircraft in their total estimate. The result will naturally be that our over-land equipment and personnel will be inferior to those of France by precisely the amount which is allocated to the Navy.

The advocates of an independent Naval Air Service are never tired of thrusting down our throats the maxim that a naval aviator must be a naval officer first and an aviator afterwards and that all his knowledge must be naval knowledge. Therefore obviously in time of a big land war our highly-skilled naval aviators will be just about as useless as is the ordinary Naval man in a land expedition "when sailorman go soldier-walkee."

In saying this one does not forget that during the War 1914-18 certain scout squadrons of the R.N.A.S. were for a time the crack fighting squadrons on the Western Front. But it is necessary to remember that the personnel of those squadrons were civilians and not the products of Dartmouth and Osborne. One suggests that the Committee of Imperial Defence might seriously consider the point as to how far our naval aviators are to be reckoned as available for inclusion in the One-Power standard.

The Offensive-Defensive.

Lord Haldane certainly made an excellent point when he drew a clear distinction between the air force necessary to co-operate with an army in the field and that necessary to protect this country against attack. One believes that the creed of the Air Staff is that offence is the best form of defence and that any home defence force will consist chiefly of long-range bombing machines which will protect this country by attacking the enemy's country.

This is a sound doctrine provided that we also maintain a

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sufficient force of fighting machines with which to repel such enemy aircraft as do reach this country. But there is much to be said for Lord Haldane's theory that for purposes of diplomatic negotiations a big bombing force in this country is worth more than a purely defensive force. A spear is better than a shield when conducting negotiations.

The Singapore Base.

As to the Admiralty's proposal to spend £9,000,000 on naval works at Singapore the advisability of doing so depends entirely on whether we really intend to protect our Eastern possessions or not. If we are going to bow to the doctrine of India for the Indians and are going to make India into a colossal Ireland then it is pure waste of money to build an enormous naval base at Singapore. It would be very much better to spend the money on the protection of South Africa and Australia against probable Japanese aggression, for after all this vast project for Singapore is nothing other than a notice to Japan saying "Thus far and no farther."

What it means is that when Japan and America do start their quarrel we shall say to Japan "You can have the American Phillipine Islands if you like and we are not going to make a fuss about your stealing the oilfields in the Dutch East Indies. But you keep East of Singapore."—That is of course unless we form an alliance with America and let the Americans and Dutch use Singapore as a base for operations against Japan. Under such circumstances the white peoples would be able to hold their own in the Pacific.

If however the £9,000,000 be spent at Singapore it also means that there will have to be an enormous aircraft base there from which it would be possible to launch air operations over the whole of the Pacific. However one is inclined to agree with Lord Haldane that before spending those £9,000,000 at Singapore we had better spend at any rate as much on an adequate home defence Air Force.

Solid Satisfaction.

Lord Salisbury's speech is absolutely unimpeachable. One quite agrees that the French have a perfect right to build up the Air Force which they are building so long as they have no objection to our doing as much and more.

It is well that Lord Salisbury should have announced publicly how much really hard work his Committee has been doing on this matter of the Air Force. As it has not been entirely an affair of the "Silent Service" we have not heard as much about it as if it had been run by and for the Admiralty, but a good many people do know that the Committee has worked so hard that it has caused quite a considerable amount of overtime in the various departments on whose future it has been sitting. His brief review of the subjects on which the Committee has deliberated give some idea of the scope of the inquiry.

His last statement that his Committee thinks that a considerable increase in the Air Force will be necessary is all that can be wished by the aeronautical community and by those who believe in Air Power. We all await with interest that promised frank statement to Parliament and to the Country as to the result of the Committee's deliberation and we look forward with considerable confidence to the results of his Committee's recommendations.—C. G. G.

THE AIR MINISTER'S TOUR.

Sir Samuel Hoare, the Air Minister, and Lady Maud Hoare, accompanied by Sir Sefton Brancker began a tour of the N.W. European Air route on Thursday last. They left Croydon in a D.H.34 (Napier) of the Daimler Airway at 09.35 and reached Rotterdam in two hours or less.

On Friday they left Rotterdam at 16.54 on a Fokker (Rolls-Royce) and reached Brussels at 17.43 where they were greeted by Colonel van Crombrugge, Chief of the Belgian Air Service.

Lady Maud Hoare proceeded, according to plan, to Paris, and Sir Samuel accompanied by Sir Sefton Brancker proceeded by Instone D.H.34 (Napier) to Cologne accompanied by Major Samuel Greer and Mrs. Greer and Colonel W. A. Bristow. One of the brothers Instone and his wife fled before them in another Instone machine to prepare their way.

Sir Samuel will fly from Cologne to Paris in a D.H.9c of the De Havilland Hire Service and after rejoining Lady Maud Hoare there they will return to London in a Handley Page.

THE AERIAL DERBY.

The Aerial Derby will take place on Aug. 6, Bank Holiday, starting from and finishing at Hendon. The course will be the same as last year (with the exception of the starting point and the fact that it will be flown counter-clockwise).

There will be a prize of £300 and trophy for the fastest time. For the Handicap there will be a first prize of £100, a second prize of £50, and a third prize of £25. If the amounts of these prizes were multiplied by four, a good international entry might be obtained.

ROYAL AERO CLUB COMPETITION DOCUMENTS.

Sundry documents have been received from the Royal Aero Club concerning the competitions which are being organised by that body. One strongly recommends that the Committee of the Royal Aero Club which is responsible for these documents should take a few elementary lessons in English composition.

The first document in order of date is headed "Grosvenor Challenge Cup" and refers to the Competition for the Prize of £100 with the Second Prize of £50 which is being offered by that good sportsman Lord Edward Grosvenor. In the second paragraph of the document the Competition is given its proper title "The Grosvenor Challenge Cup."

In this document one notices that the course for the race is to be Lympne, Croydon, Castle Bromwich, Bristol, Croydon and Lympne. One suggests that in order to popularise aviation the return course might well be along the South Coast instead of bringing the competitors back from Bristol. At that time of the year the South Coast watering places ought to be fairly well populated and the passing of the competitors over those places would do much more to popularise aviation than would their passing along the Great Western Railway and over the Weald of Kent.

The second document, though perhaps the first in order of importance, is headed "The Duke of Sutherland Motor Glider Competition," which is neither English nor sense. It should be either "The Duke of Sutherland's Prize Competition" or "The Sutherland Prize Competition." In any case it is not the "Duke of Sutherland Motor Glider" because the Competition is certainly not for a motor glider called the Duke of Sutherland nor is it a competition for a motor glider belonging to the Duke of Sutherland. Furthermore in any event there is no such thing as a "motor glider," as one has already indicated in this paper on several occasions.

The Sub-Committee concerned have drawn up the rules for this competition in a praiseworthy manner and there is little fault to be found with them except perhaps that the cylinder capacity which they allow permits or almost enforces the use of quite a big aeroplane.

An interesting point in this document is the fact that the entry fee for the Duke of Sutherland's Prize Competition also covers the entry for the *Daily Mail* Prize. This does at any rate indicate that the Committee of the Royal Aero Club recognises the giving of the Duke of Sutherland's Prize as the senior event. This may tend perhaps to put the *Daily Mail* in its proper place after its gross harmsworthiness in announcing its prize, but it still seems that the Aero Club Committee is making a mistake in admitting that there is any direct connection between the two.

The third document is headed "The *Daily Mail* Motor Glider Competition." To this one's only objection is that as aforesaid such a thing as a "motor glider" cannot exist. Personally one prefers, as being less banal, the word "aero-scooter" which is already attaining a considerable amount of popularity among the irreverent who are concerned with light aeroplanes of the 750 c.c. class. The American term "aerial flivver" is more cumbersome and less euphonious than "aero-scooter" and incidentally connotes a rather heavier type of machine in that the word "flivver" by itself implies the Ford Car in the American language. Therefore the term might be more justly applied to a D.H.6 or a jo-ride Avro rather than to the miniature aeroplane of the "aero-scooter" class.

Both the second and third documents include a footnote headed "Abdulla Prize." This might more correctly have been called "The Abdulla Prize." The paragraph says "Messrs. Abdulla & Company Ltd. have presented to the Royal Aero Club a Prize of £500 for a Speed Contest open to all Competitors taking part in the Motor Glider Competitions. The Prize will be awarded to the Competitor who completes, in the fastest time, a course of approximately 30 miles to be selected by the Royal Aero Club. For this Contest the fuel allowance will not be limited."

In the first place a limited company, though in some cases the management may be messers, cannot possibly be Messieurs seeing that a limited company is a singular entity. And as regards the last sentence, if the fuel consumption be unlimited there cannot be a fuel "allowance" seeing that the word allowance commonly indicates a definite ration. This point however is perhaps open to argument.

Nevertheless the Committee of the Royal Aero Club doubtless mean well and these documents do at any rate indicate that there will be a certain amount of innocent amusement to be obtained from "aero-scooters" in or about the months of September and/or October. It is satisfactory to know that quite a number of private individuals are producing vehicles of this class. Several big aircraft firms are building for these competitions, some of them are also building machines for private individuals and here and there little groups of interested young sportsmen are building their own machines.—C. G. G.

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R.A.F. INTELLIGENCE

Appointments.

Week ending May 21, 1923.

GENERAL DUTIES BRANCH.—S/Ldr. A. S. C. Maclaren, O.B.E., M.C., D.F.C., A.F.C., to No. 1 S. of T.T. (Boys), Halton, 1/6, on transfer to Home Establishment.

F/Lts. J. E. B. B. Maclean, D.S.C, to Aircraft Depot, Iraq, 14/3; W. E. C. B. C. Forsyth, to No. 8 Sqdn., Iraq, 14/3; F. St. J. Woollard, A.F.C., to H.Q., Palestine Command, 4/5

F/Os. R. H. W. Empson, to No. 1 Sqdn., Iraq, 3/3; F. J. C. Rybot, to No. 55 Sqdn., Iraq, 14/3; T. W. Shortridge, to No. 30 Sqdn., Iraq, 14/3; H. S. Hobby, M.C., to No. 215 Sqdn., Egypt, 8/5, on secondg. from the Army; R. H. Daly, D.S.C., D.F.C., to No. 39 Sqdn., Spittlegate, 14/5; A. G. Jarvis, A.F.C., to Stores Depot, Egypt, 3/5; R. de L. Stedman, to R.A.F. Depot, 14/5 (non-effective pool); S. H. Potter, to No. 100 Sqdn., Spittlegate, 14/5; A. Turner, M.M., to No. 11 Sqdn., Andover, 22/5; J. E. L. Drabble, to R.A.F. Depot, 14/5 (non-effective pool); E. T. O'N. Hogben, to No. 1 F.T.S., Netheravon, 15/5, for course of instruction, on seconding from the Army.

P/O. E. S. C. Vaughan, M.C., to No. 100 Sqdn, Spittlegate, 14/5.

STORES AND ACCOUNTANTS BRANCH.—Wing/Cmdr. (Stores) T. O. Lyons, O.B.E., to No. 3 Grp. H.Q., Spittlegate, 14/5, for Technical Staff duties.

F/O. (Stores) W. J. Eagle, to Base Supply Depot, Iraq, 7/4, on appt. to a Short Service Commission.

F/O. (Accts.) A. J. Moore, to Aircraft Depot, Iraq, 11/4.

The British Empire Medal.

H.M. the King has been pleased to approve of the award of the Medal of the Military Division of the Order of the British Empire to the undermentioned, to be dated December 28th, 1922 :—

R.A.F.—No. 1287 F/Sjt. James Kemp Tough, R.A.F. (To be dated December 30th, 1922.) No. 334286 Sjt. Frank Lowry, R.A.F.; No. 60056 Cpl. (A/Sjt.) Herbert Sydney Allen, R.A.F.; No. 331463 Cpl. William Victor James Bancroft, R.A.F.; No. 341282 Cpl. Harry Bowick, R.A.F.

R.A.F. Awards.

H.M. the King has approved of the following rewards for distinguished service :—

KURDISTAN.

BAR TO D.F.C.—F/Lt. W. H. Park, M.C., D.F.C.; F/Lt. F. O. Soden, D.F.C.

D.F.C.—F/O. S. T. B. Cripps; F/O. G. D. Daly.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

R.A.F. Individual Boxing Championships.

The Royal Air Force Individual Boxing Championships were held at Halton Camp on the afternoon and evening of Wednesday the 18th and the evening of Thursday 19th Apr.

The general standard of boxing was undoubtedly the finest seen in the Royal Air Force Meetings of the last two years.

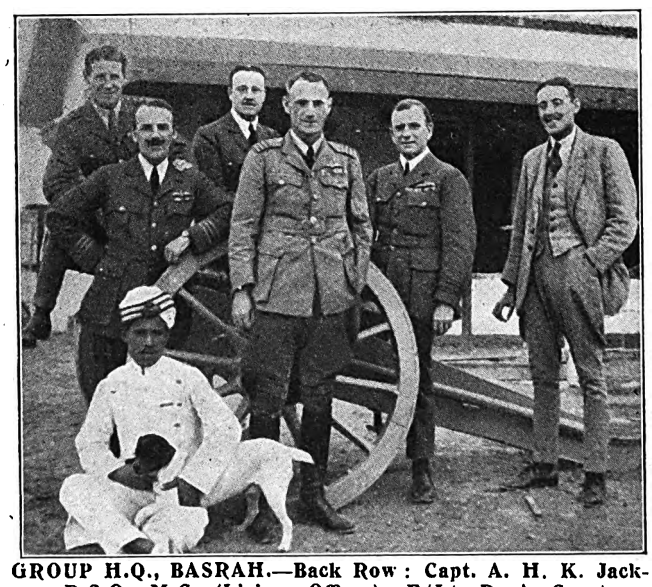
Air Vice-Marshal A. V. Vyvyan, the President of the Royal Air Force Boxing Association, in his speech at the presentation of the prizes, commented strongly on the marked improvement of the boxing at these shows especially the Officers' Competitions.

The results were as follows :—

OFFICERS.—FEATHERWEIGHT : F/O. Walker (Kenley) beat F/O. Howard (Flowerdown) on points. LIGHTWEIGHT : F/O. Whitfield (Cranwell) beat F/Lt. Smith (Halton) in the first round the Referee stopping the fight. WELTERWEIGHT : F/O. MacGregor (Shotwick) beat P/O. Larman (Duxford) on points. MIDDLEWEIGHT : F/O Adams (Uxbridge) beat F/O. Farrow (Farnborough) on points. HEAVYWEIGHT : P/O. Scott (Duxford) beat F/O. Hart (Halton) on points.

AIRMEN.—FLYWEIGHT : AC. Mayes (Halton) beat L/AC. Warren (Calshot) on points. BANTAMWEIGHT : AC. Davies (Halton) beat AC. Lewis (Farnborough) on points. FEATHERWEIGHT : L/AC. Boteler (Shrewsbury) knocked out AC. Giblen (Manston) in the first round. LIGHTWEIGHT : Cpl. Bunn (Uxbridge) beat Sjt. Salter (Halton) on points. WELTERWEIGHT : AC. Bill, D.C.M. (Halton) knocked out AC. Tooley (Halton) in first round. MIDDLEWEIGHT : Cpl. Higgins (Uxbridge) beat AC. Ballantyne (Winchester) who gave up in the first round owing to damaged arm. L/HEAVYWEIGHT : AC. Williams (Manston) beat Cpl. Blythe (Cranwell) on points. HEAVYWEIGHT : AC. Hankinson (Uxbridge) knocked out AC. Forrester (Halton) in first round.

The best loser's prize for the Meeting was awarded to Cpl. Campbell (Manston) for his fight against AC. Lewis (Farnborough) in the second series of the Airmen's Bantamweight.



GROUP H.Q., BASRAH.—Back Row : Capt. A. H. K. Jackson, D.S.O., M.C. (Liaison Officer); F/Lt. R. A. Courtney, M.B.E. Front Row : Wing Cmdr. C. R. S. Bradley, O.B.E.; Grp. Capt. E. F. Briggs, D.S.O., O.B.E.; S/Ldr. H. E. M. Watkins, A.F.C.; S/Ldr. L. T. N. Gould, M.C.

Aircraft Depot (Iraq.)

The following report on sports and recreations has been received :—

Early in the year a General Sports Committee was elected under the Presidency of the Commanding Officer, Wing/Cmdr. W. C. Hicks, A.F.C., and Sub-Committes were formed with a view to organising all classes of sport on the station, it being realised that healthy recreation was essential to the well being of all concerned.

FOOTBALL : The Depot team for the second time in succession won the Overland Cup competed for by all teams in Baghdad district. The cup thus becomes their own property. The Unit also won the Baghdad League (Western Division) and have been given a walk-over by the winners of the Eastern Division. In addition to unit matches, inter-squadron and inter-bungalow competitions have been carried through.

ATHLETIC SPORTS : The Annual Sports were held on Mar. 17 before a large number of visitors, including Air Vice-Marshal Sir J. M. Salmond, who, at the distribution of prizes by Mrs. Prescott, wife of Lt.-Col. H. C. Prescott, C.I.E., Inspector-General Iraq Police, congratulated all concerned in the manner in which the programme had been carried out, and also on the excellent way in which the Unit had responded to every call that had been made upon it.

BOXING : A Novices' Competition was held on Feb. 19 and some excellent boxing was witnessed. The results were as follows :—Bantam, AC. Carter; Light, AC. Bunce; Welter, AC. Garner; Middle, AC. Peebles; Welter, 5-round contest, AC. Brady beat AC. Bristowe.

An Open Boxing Competition was held on Mar. 22 and 23, attracting some 60 entrants. The large hangar, in which the competition was held, was well filled each evening. The cups and prizes were presented by Air/Cmdre. L. E. O. Charlton, who congratulated the competitors on the spirit in which the various contests had been fought, and those responsible for the excellent arrangements made.

The results were as follows :—Fly, AC. Izzard, No. 5 Armoured Car Co.; Bantam, AC. Germain, No. 55 Sqdn.; Feather, AC. Ballantyne, No. 45 Sqdn.; Light, AC. Witcombe, Aircraft Depot (M.T. Pool); Welter, AC. Brady, Aircraft Depot; Middle, L/AC. Peebles, Aircraft Depot; Light-Heavy, Cpl. Russell, No. 70 Sqdn.

Best Losers' Prizes were awarded to :—AC. Sunter, No. 5 Armoured Car Co.; AC. Leach, No. 70 Sqdn.

ENTERTAINMENTS : The "Ay Dee" Concert Party gave their second series of concerts on Apr. 5, 6 and 7, and the performances were greatly appreciated by large audiences at each performance. Further entertainments are looked for in the future. The Station Cinema continues to be popular, and gives three shows a week.

CRICKET : Cricket is now in full swing, and matches are being played against the leading teams in Iraq, and inter-squadron and inter-bungalow competitions are being carried through.

CROSS-COUNTRY RACE : An inter-squadron cross-country race was held on Good Friday, and resulted in an easy win for "C" Squadron, F/Sjt. Woollard being first man home.

Aircraft Depot (Egypt.)

The Depot has experienced a very satisfactory year in the sporting world. Their various successes include :—

ASSOCIATION FOOTBALL :—Winners, Middle East Football Cup (R.A.F.); Runners up, Carver Hazelden Cup; Runners up, Alexandria and District League 1st Division; Winners, Alexandria and District League 2nd Division.

BOXING :—Winners, Middle East Novices Championship 1922 (R.A.F.); Winners, Middle East Open Championship 1923 (R.A.F.); Winners, of Fly, Light and Middle Weights in Middle East Inter-Services Championships (1923).

(Continued on page 386.)

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

A very interesting paper by Major M. E. A. Wright, the pilot of the "Wren," on the problems of low-powered flight, together with the discussion thereon, is reported below.

A description of a twin-cylinder motor-cycle engine of under 700 c.c. capacity, which develops up to 24 B.H.P., is given on page 382.

A report of the Fire Prevention Sub-Committee of the Aeronautical Research Committee dealing with the precautions which should be taken to prevent fire on single-engined aeroplanes is reviewed in this number.

FLYING WITH LOW POWER.

The paper by Major M. E. A. Wright on "Flying with Low Power" read before the Institution of Aeronautical Engineers on Friday, May 11, attracted the largest audience yet seen at a meeting of the Institution, and proved to be of very great interest.

Major Wright referred the opinion held in some quarters that the present movement for the development of low-power aeroplanes was merely an attempt to go back to the beginning of aviation and to reject all the accumulated experience of the past 15 years.

The aeroplane of 10 years ago was thought to be a real flying machine if it had a ceiling of 150 ft. These machines had just enough power to fly and no speed range to speak of and they were extremely dangerous. The average pilot of to-day would find that these machines would tax his skill to the utmost to fly at all, and it was surprising that smashes on them were not more frequent.

How the Powerful Aeroplane Evolved.

It was soon discovered that an increase in engine power made these machines safer rather than more dangerous—for with an increased speed range and a reserve of power more libertics could be taken without stalling.

As a result of this discovery the development of the aeroplane became dependent on the development of better engines. The War accentuated this tendency, by calling for increased performance and by the need which developed for the fitting of items of equipment necessary for war purposes.

It was not possible to design these items as part of each aeroplane, and they were in fact usually designed with no regard to their effect on the resistance of the machine and consequently considerable increase in power was needed to drag the equipment through the air.

[It is probably true to remark that it would not have paid to have designed a really clean machine during the war, as the effect of the innumerable excrescences which it would have been necessary to fit for war purposes would have entirely spoilt its performance.—Ed.]

Performance thus became entirely a matter of more and more engine power. Speed increased very rapidly, and the optimists looked for speeds of 300 and 400 m.p.h. in the near future. However when 180 m.p.h. or so was reached it became obvious that further increases would become very expensive and that the effects of increasing power above a certain limit were not to give the same relative speed increase as could formerly be obtained. However by this time the belief was fairly firmly implanted that speed meant power and power only, and aeroplane design had settled down to standardised lines in which the problem of reducing resistance was a secondary matter affecting details only.

How the Treaty of Versailles has Helped.

Major Wright then mentioned the attention given in Germany to gliding as the result largely of the restrictions imposed on German power aircraft development.

The result of German attempts to produce really clean gliders was to show that a machine which carried a man could be made which needed only about 2 h.p. to keep it in level flight. These German tests suggested that a gliding angle of not less than 1 in 12 or so was necessary for soaring.

The British meeting at Itford last autumn somewhat detracted from this belief, for the very strong wind and the excellent ground conditions made it possible to soar on relatively poor gliders, provided that controllability was ample. It was probable that a standard Avro with its engine stopped could have soared at Itford.

However the Itford meeting produced machines which tended to confirm the estimate that about 2 h.p. could be made to support a man-carrying aeroplane.

The "Wren."

Mr. W. O. Manning as a result designed a machine which according to estimates could fly with 3½ h.p. and the machine (the "Wren") was built to see if these calculations were borne out in practice.

The first trials were made on a field rougher than the average aerodrome and the machine astonished everybody—including Major Wright who was the pilot—by leaving the field after a run of not more than 50 yards against an 8 m.p.h. breeze.

The machine was then taken to Lytham Sands in order to make a long straight flight along the strip of open beach available, in order to test controls. This test was made in a 15 m.p.h. wind. When the throttle was opened gently, nothing seemed at first to happen. The last part of the throttle range however made the machine start to move. After some six feet of movement the machine began to accelerate rapidly and reached flying speed in 30 yards. She was however held to the ground for about 60 yards to gain reserve speed, and once in the air she climbed rapidly at 40 m.p.h. air speed to about 100 ft.

At this height the engine was throttled well down but still at 40 m.p.h. the machine rose to 300 ft. in about five mins. After another couple of minutes the machine was landed in a field and taken back to the shed.

The flight showed that the machine, like most new machines, needed a few minor adjustments. It also showed that, with an engine of only 400 c.c. the machine would:—(1) take pilot and about 2 hours' fuel off the ground without external assistance; (2) that the machine had a speed range of from 23 to 50 m.p.h.; (3) that the rate of climb was between 150 and 200 ft. per minute at sea level; (4) that level flight was possible on approximately half the engine power, and (5) that a direct drive airscrew running at 2,700 r.p.m. was quite reasonably efficient for the power and speed in question.

Thus the "Wren" proves to have fulfilled the most important requirements of a safe flying machine. It has a large speed range and an adequate reserve of power, and lands so slowly that a forced landing can be made almost anywhere without risk of serious injury to the machine.

Control and Sensitivity.

Experience is not yet sufficient to show whether the machine has ample control in really rough weather. In ordinary weather the control is sufficient to provide rapid manœuvrability.

The very low wing loading (2½ lbs. per sq. ft.) will probably make such a machine sensitive to air disturbance. The

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use of controls must absorb power, and in machines of very low resistance the controls will absorb a larger proportion of the total power available than in a type of higher resistance.

The "Wren's" loading is in fact no lower than that of the pre-war 50 Gnôme "box kite," and these machines could be flown in very bad weather. Nevertheless it may be found that it will pay to increase the loading and the speed and power somewhat in order to make a better rough-weather machine.

This problem of securing adequate control in machines of this type is probably the most important one yet to be solved. It is possible that the lack of control shown by some of the machines at Itford was due more to the shape and disposition of surfaces than to their light loading.

It is also possible that it will be found that it is desirable to use controls on these low-powered machines rather in a series of mild jerks than by a steady holding over of the surfaces. This method would make use of the machine's inertia to overcome the control drag, and would not tend to stall the machine as would a steadily-applied drag.

THE FUTURE OF THE LOW-POWERED TYPE.

In one respect Major Wright regretted that the development of the low-powered type from the glider had been so rapid. A little longer experience with the glider would have enabled the purely aerodynamic problems to be investigated more fully. Now that the engine had been introduced there was again the risk that the easy step of putting up engine power would be taken when difficulties such as that of control were encountered, rather than that of discovering what was the matter with the aeroplane itself.

With careful development Major Wright felt confident that it would be found possible to develop a single-seater of not more than 12 h.p. with a top speed of 80 m.p.h., a cruising speed of 60 m.p.h., a landing speed of 28 m.p.h. and a ceiling of 8-10,000 ft., carrying 230 lbs. of useful load with a range of 360 miles at 100 miles per gallon.

If such a machine was to fulfil any public demand, it must be able to take off and land in any ordinary field, and climb clear of obstacles. This did not mean a high rate of climb—for its ground speed climbing would be low, and quite a moderate climb would give a good climbing gradient. The manœuvrability of such machines should also allow them to turn in a small radius, and so permit of climbing in a spiral in a restricted space to get over big obstacles.

The machine must also be transportable so that it can be taken out of a field through the ordinary gate to a shelter, and it should pack into a relatively small space for stowage. If the overall height is kept below 5 ft. and the wings are easily detachable, these two requirements would be met.

The problem of engine rating for such machines is somewhat of a difficulty. Both in France and in England the volume swept by the pistons forms the basis for engine limitation for competition. No limit is imposed on r.p.m., and therefore it is not possible to estimate the power actually used under such rating rules.

A good deal of misunderstanding had already arisen over comparisons of the "Wren" and M. Barbot's Dewoitine machine, owing to the difference in the cylinder capacity. The "Wren's" engine is of 398 c.c. and that of the Dewoitine of 1,130 c.c. At a rough estimate the Clerget engine used by Barbot runs at 1,450 r.p.m. on the ground and 1,650 r.p.m. in the air. The A.B.C. engine of the "Wren" runs at 2,600 r.p.m. on the ground and at 2,900 at 51 m.p.h.

On this basis the maximum h.p. of the Dewoitine is about 15 h.p., that of the "Wren" about 8 h.p.

Suggestions for a more accurate method of rating engines would be of value and he hoped the discussion would touch this subject.

The paper was illustrated by lantern-slides showing various gliders, the "Wren," M. Barbot's "Dewoitine" machine, and was followed by a film of the flight made by Major Wright on the "Wren" at Lytham.

THE DISCUSSION.

CAPT. SAYERS in reply to a definite question raised by Major Wright said that he wished that he knew definitely why the controls of the C.W.S. glider failed so entirely. There were a number of possible contributory causes and he rather believed that each had its share.

He cordially agreed with the lecturer in regretting the sudden appearance of the low-powered machine if it led to neglect of the glider. We had still much to learn from gliders and putting in an engine obscured some of these problems. He thought Major Wright was if anything pessimistice in his forecasts.

Provided progress continued on the right lines he thought that the commercial three-seater of two years hence would cruise to Paris with an engine of 1,500 c.c. at 80 m.p.h. or more, using 1 gallon of petrol for 25 miles.

Major O. T. GNOSSPELIUS said that the problem of producing a low-powered aeroplane was one of making a machine the right shape. The ordinary biplane had a L/D ratio of 11 to 1 if one was very lucky. Usually it was nearer 8 to 1. It was quite obvious that if one made a machine of the right shape this could be greatly improved.

Because a good wing alone had an L/D of 18/1 it was often assumed that the whole aeroplane could not be better than this. He did not believe that it was impossible greatly to increase this ratio. A railway train had a gliding angle of 1 in 100, why shouldn't an aeroplane? If this figure could be reached the aeroplane would be the cheapest form of transport in existence.

The great advantage of the light type of aeroplane was that one could afford to make it and find out what was wrong with it. The ordinary aeroplane cost too much to be built experimentally.

His experiments led him to distrust thick wings. He suspected them of burbling in the middle long before the whole wing stalled, and he thought that the failure of rudder control on gliders was possibly due to the rudders being in dead air caused by thick wings. If one wanted to use thick wings it was essential to use a heavy undercamber which would secure a thin fine-angled trailing edge.

Mr. PARROT recalled Mr. A. V. Roe's early experiments. He himself had not joined Mr. Roe till after the period of the 9 h.p. triplane but he joined very shortly afterwards and heard all about it. That machine had a motor-cycle engine which certainly did not give as much power as some modern cycle engines. It only just hopped off the ground, and did not make a circuit, but he thought a good deal of its failure to perform was due to lack of piloting experience.

Mr. CHADWICK expressed himself as greatly interested in the low-powered machine, and expressed the opinion that the firm (A. V. Roe and Co. Ltd.) with which he was connected would have to build one. At present he confessed he did not quite know how to attack the problem—the scale was so different to standard practice. But he rather felt that an undue fuss was being made of some recent performances.

M. Barbot's recent flight—if one could trust the papers—was made with a petrol consumption of one gallon for about 30 to 40 miles. The Avro "Baby" had stopped in the air for one hour on one gallon making 50 m.p.h. which was a better performance altogether.

He thought that for the conditions of the forthcoming competitions there was something to be said for the biplane type.

Dr. HANKIN said that he was interested in Major Wright's reference to the intermittent use of controls. Soaring birds did their controlling by quick movements of their wing-tip feathers, and in all successful flying creatures the wrist, which allowed such intermittent tip movements to be used, was well developed.

Mr. HOWARD FLANDERS said that Mr. Parrot's reference to Mr. Roe's early efforts moved him to speak as he was concerned with Mr. Roe in the construction of this machine. He did not believe the 9 h.p. engine gave 9 h.p. It vibrated in the most appalling way—nearly throwing one out of the seat at full power. The airscrews and the transmission were inefficient, and the control arrangements were crude and inconvenient. But he believed that if that machine were rebuilt, and fitted with normal controls a good pilot could get circuits out of it.

He recalled the very grave difficulties under which this early work was carried on. He instanced the fact that originally the police wanted to stop them flying in the early morning over Lea Marshes because they were endangering the public. After Blériot had flown the Channel they also wanted to prevent their flying on the ground of the obstruction to traffic caused by all vehicles passing stopping to watch them.

Mr. TILGHMAN RICHARDS remarked that it was rather extraordinary that so long had elapsed before the low-powered machine came into existence. Everything that had been done now could have been done five years ago. All the troubles with light aeroplanes were those encountered with heavy ones—in an exaggerated form. He wondered whether this was an indication that a "petrified ornithopter" was not the right shape to push through the air.

As one who had tried it he would like to utter a warning against the use of the Peyret type of control. The same surface was used both as aileron and elevator, with a bad pilot or a learner the condition might arise where a surface already at its full angle as an aileron might be needed to operate still further as an elevator. If they put stops to limit its travel a scared pilot might wreck his controls in a tight corner. If they did not the controls might go to an angle which would certainly lead to a stall.

Mr. W. O. MANNING said that the "Wren" control surfaces were designed according to normal considerations of aeroplane practice, and they appeared to work. He pointed out that in this case, the use of ailerons to their full extent

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might double the machine resistance, which might lead to a stall, unless the machine was dived to some extent.

He could not accept Major Gnosspelius' suggestion as to the effect of thick wings on rudders.

The "Wren" had a thick wing and the rudder worked. Mr. Raynham's rudder at Itford was visibly flapping in a definite wind, and its failure to turn the machine was due to some cause other than that suggested. Personally he thought the trouble was absence of dihedral, giving the rudder no abutment about which to turn the machine.

ENGINES FOR LIGHT AEROPLANES.

The Blackburne 697 c.c. Engine.

This engine, which is built by Burney & Blackburne Ltd. of Bookham, Surrey, has given extremely satisfactory results in motor-cycles and cycle-cars, both on the road and on the track, and it cannot in any way be regarded as an experimental engine.

The engine is of the 60° Vee-twin type, fitted with overhead and valves, push-rod operated. The combustion chamber and valve port and gear design are evidently excellent, from the evidences of the power curve which show that the engine develops a B.M.E.P. of 119 lbs. per sq. in. at 2,500 r.p.m. and that the B.M.E.P. is maintained at nearly 110 lbs. at 4,000 r.p.m.

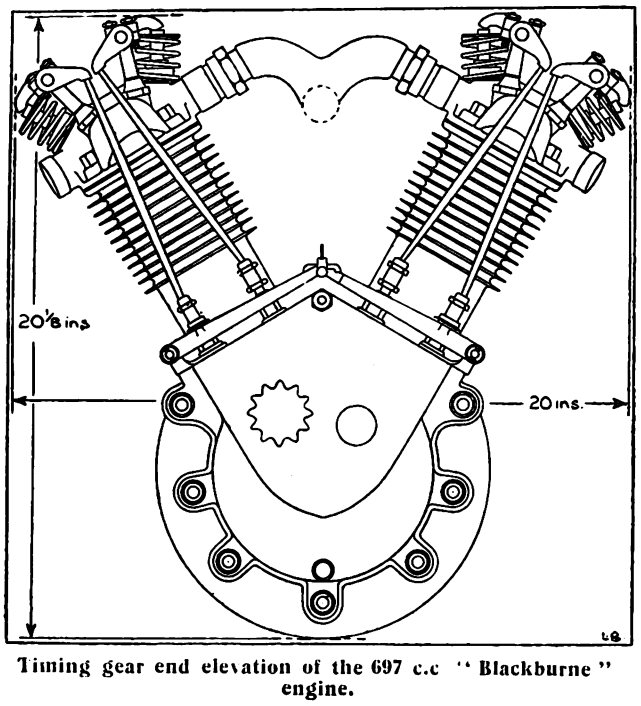
The bore and stroke are 71 mm. × 88 mm. Aluminium pistons and light connecting-rods are fitted, and with these the balance at high r.p.m. is extremely satisfactory. The engine is fitted with an outside fly-wheel, which in view of its large diameter can be made considerably lighter than the internal fly-wheels which are frequently used on this type of engine.

For use with a chain-driven airscrew it is probable that a still lighter fly-wheel could be used and for a direct drive the fly-wheel could probably be omitted altogether. If the engine is to be used at its maximum power and r.p.m. a direct drive airscrew is probably out of the question on the score of efficiency, but in view of the very large output available it may pay, for the petrol economy competitions at least, to hold the engine down to about 2,500 r.p.m. at about which speed it seems probable that the maximum engine efficiency will be attained. A reasonably efficient airscrew can pretty certainly be used at this speed.

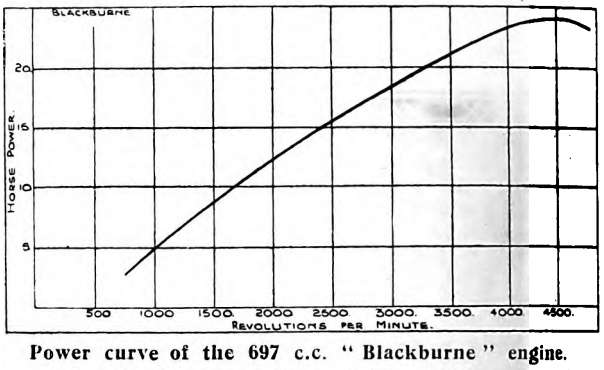
The engine presents ample facilities for attachment to an aeroplane structure, as there are seven $\frac{3}{8}$-in. dia. bolts in the crankcase, and practically any two pairs of these could be used for the attachment of brackets to sit upon engine-bearers.

The inlet valve ports face inwards, and the standard induction-pipe is arranged to carry the carburetter in between the two cylinders. In order to allow for an ample gravity head of petrol it may be desirable to modify the induction system to carry the carburetter at a considerably lower level, which would mean bringing the induction-pipes backwards from the ports. Mechanically this presents no difficulty, but the induction-pipes themselves will require careful design if they are to be greatly lengthened.

The exhaust ports face slightly back from the drive-end of the crankshaft—but the exhaust valve domes and springs are in a position to be effectively cooled by the slip-stream.



Timing gear end elevation of the 697 c.c "Blackburne" engine.



Power curve of the 697 c.c. "Blackburne" engine.

The engine alone weighs only 54 lbs. The standard fly-wheel weighs 12 lbs., and the standard M.L. magneto and drive weighs 7 lbs. The engine without carburetter thus weighs 73 lbs. or a shade over 3 lbs. per h.p. at the maximum output of 24 B.H.P.

If a direct drive airscrew and no fly-wheel is used, and the engine is run at a maximum of 16 B.H.P. and 2,500 r.p.m. the weight per h.p. is only about 3.2 lbs. In any case the weight of fly-wheel can probably be appreciably reduced, and in all probability a lighter magneto than the standard can be used.

It will be seen that even at well below its maximum power the engine compares very favourably indeed with normal aero engines of high power, and that quite a sound flying machine should be possible with this engine.

The makers claim only a petrol consumption of 0.6 to 0.7 pints per B.H.P. hour. They do not specify the conditions under which this figure is obtained, but with the very high M.E.P. obtained on this engine it seems probable that even better results could be obtained as a result of careful tuning for maximum economy rather than for maximum power.

THE PREVENTION OF FIRE.

The Aeronautical Research Committee have just issued as R. and M. No. 795, a report of the Fire Prevention Sub-Committee entitled "The Prevention of Fire in Single-engined Aircraft."

This report consists in the main of a series of recommendations, the majority of which are already well known, and very generally observed in the design of modern aeroplanes, and the tardy publication of this report is apparently only one instance of the delay which is habitual in the publication of Aeronautical Research Committee Reports.

Fires may occur either in the air, or on the ground following a crash. The first type of fire is rare, and occurs as the result of the ignition of petrol from a leak or of petrol vapour, either by back-firing of the engine, by sparking of the magneto, or from faulty electrical installations.

Fires on crash which are much more common and may originate from a variety of causes, but it would appear that generally petrol is not the primary culprit. Liquid petrol will not ignite on contact with a hot exhaust pipe. Chips of timber, fabric, or oily dirt may ignite on contact with metal at quite low temperatures, and such materials are probably the intermediary agent causing ignition of petrol in the majority of cases.

The recommendations of the Committee are briefly:—

(1) The use of a fireproof bulkhead between the engine and the rest of the aeroplane.

(2) The exclusion from the engine side of this bulkhead of any material which will support combustion—or practically the use of all-metal engine mountings.

(3) The exclusion of rubber or soft-soldered joints in petrol pipes from the engine side of the bulkhead.

(4) The thorough draining of all places where petrol might collect as a result of leaks.

(5) That it is undesirable to place oil tanks on the engine side of the bulkhead, and that such tanks if damaged should empty themselves clear of the structure.

(6) The use of only one petrol connection passing through the engine bulkhead, and the provision of one cock which will cut off this supply in case of fire.

(7) The leading of carburetter intakes to right outside the machine, and placing these intakes well away from the exhaust manifolds.

(8) That only fireproof magnetos should be used on aeroplanes.

(9) That petrol tanks should be provided with safety valves, or bursting discs, with arrangements to lead away petrol and vapour to the outside of the machine.

(10) That all fabric covering in the neighbourhood of the engine should be as non-flammable as possible.

(11) That the design of exhaust manifolds which will keep cooler than those at present in use should be encouraged.

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There are other recommendations of less importance, but the general trend of the recommendations is obvious from the above. There are in addition to the recommendations a number of notes of an explanatory nature.

The Report is published by H.M. Stationery Office, and may be obtained from any of the Stationery Office branches, price 1s. net, or 1s. 1d. post free.

COMPENSATION FOR AMERICAN USE OF BRITISH AIRCRAFT.

When the U.S.A. decided to take part in the European War they were, it will be remembered, in no position to equip themselves with a reasonably effective Air Force as the American Aircraft Industry had no experienced designers of war aircraft.

Naturally the American Government sought assistance from its new Allies in order to take advantage of their dearly-bought experience, and arrangements were made whereby they were to be provided with designs for modern aircraft in order that they might start at once on the production of useful aeroplanes.

A number of British aircraft manufacturers were instructed by the British Air Board to place their designs at the disposal of the American authorities. They were definitely informed by the Air Board that they would receive "compensation" for this service.

It was not till long after the end of the war that a Commission was set up to deal with the claims of aircraft constructors for the services rendered in the design of aircraft but even this Commission did not deal with claims for the use of designs by America.

Early in 1923 an American Commission arrived in this country with the announced intention of settling such claims. Much was made in the daily press of the vast sums of money at their disposal and of the generous intentions of the U.S. Government in this matter.

This Commission, it was announced, would sit in joint session with the British Commission to hear these claims. Compensation for war user was to be made by the British Government, which was responsible for the instructions to British firms to place their designs in the hands of America, but the American Government assumed responsibility for post-war user.

Firms concerned were invited to enter into an agreement to submit their claims to this joint Commission and to accept the Commission's award on these terms. The firms involved agreed—assuming naturally that the Commission would put a normal interpretation on the terms war and post-war user—and they thus bound themselves not to seek redress from the findings of the Commission if those findings were unsatisfactory.

When the claims came before the Commission claimants were informed that "Post War User" meant building machines after the War.

Among the designs most widely used in America was the D.H.4. The Aircraft Manufacturing Company who were responsible for this design sent to America not only drawings and sample machines, but a number of their most skilled employees. They also trained at their own works a large number of Americans.

The American Government ordered 9,000 D.H.4s, 4,840 of these were delivered. Over 1,700 of them are in use to-day in America the majority of them in U.S. Army and U.S. Air Mail Service.

The American Government paid certain American firms £6,500,000 for D.H.4s. Under the decision of the Joint Commission the Aircraft Manufacturing Co. get nothing whatever in respect of the use of their design at the present time.

The Company claimed 10 per cent. royalty on the sale price of machines to their design, which would have amounted to £650,000 if the whole of the D.H.4s delivered were taken into account, plus £250,000 for loss of goodwill. Apparently they did not claim in respect of all machines paid for by America, but for those used, and their total claim amounted to £650,000.

This claim was referred to at a hearing as "fantastic" and they were awarded £65,000, or about £3 15s. for each D.H.4 at present in use in America, and about £1 6s. for each D.H.4 delivered in America.

It is to be remembered clearly that aircraft firms during the war were entirely in the hands of the British Government A firm had no option of any kind if the Government instructed it to supply drawings to a rival manufacturer—even of another nation. The British Government took upon itself all responsibility for compensation, and in fact it is believed to have forbidden one British firm to make a direct agreement with the U.S. Government for compensation for the use of its designs.

The British members of the Joint Commission agreed to the ruling that "post-war user" was to include only the building of the machines after the war and not the use after the war of machines built for war use, without prior notification to the Claimants and without allowing the matter to be argued.

Nobody in their senses would expect the U.S. Government, which repudiated the Treaty of Peace engineered in the main by their own representative, voluntarily to add to their war expenses by insisting on a generous treatment of Allied subjects who had assisted them in the war which had brought to the U.S.A. much wealth, so that the whole responsibility for this extraordinarily mean decision rests ultimately on the British Government.

The case of the Aircraft Manufacturing Company if it is perhaps the most surprising is not the only one—in fact in most of the claims put before this Joint Commission the awards made can scarcely have paid the costs of making the claim.

If the British Government is content to let this matter of the American claims rest where it now stands there is probably no method whereby the injured firms can obtain redress.

But a recollection of this particularly shabby treatment is not likely to encourage those who remember it again to place at the country's disposal all their energies and abilities in any future emergency.

A LOW-POWERED RADIAL ENGINE.

Probably a good many readers of THE AEROPLANE will remember the very interesting little five-cylinder air-cooled radial engine which was built in and fitted in 1919 to the Enfield Allday light car.

Mr. A. W. Reeves, of Victoria Chambers, 3, Edmund Street, Birmingham, who was responsible for the design and construction of this engine, states that since that time he has steadily improved this design privately, and that he believes that it would form an excellent power plant for low-powered aeroplanes. He would be glad to hear from any firm which would be interested to take up this design.

The original engine was of 1,000 c.c. capacity, and developed 30 h.p. at 3,100 r.p.m. This is of course considerably outside the rating for the forthcoming competition but a three-cylinder engine of the same bore and stroke would be well within the limits, and on the score of cost and simplicity of maintenance the three-cylinder unit would have advantages.

NEW COMPANIES.

AIR VENTURERS, LTD. was registered on May 1 with a nominal capital of £100 in £1 shares. The objects are: to carry on the business of manufacturers and warehousers of aeroplanes, etc. The subscribers (each with one share) are:—

H. W. Merckel, Kingswood, Warlingham, Surrey, law student.

L. A. Harris, 381, High Road, Wood Green, N. 22, clerk, and five other clerks. The minimum cash subscription is seven shares. No persons had consented to act as directors to April 26th. Qualification £1. Remuneration as fixed by the company. Solicitors: Kenneth Brown, Baker, Baker, Lennox House, Norfolk Street, Strand, W.C. No notice of situation of registered office was filled at time of incorporation. The file number is 189,657.

R. DELACOMBE, LTD. (189,741)—Private co. Registered May 3. Capital £1,000 in £1 shares. To carry on the business of sellers, hirers and purchasers of Scott motor cycles and sidecars, and all component parts and accessories therefor, manufacturers of and dealers in motor-cars, motor-boats, marine motors, aeroplanes, hydroplanes, airships, etc. The first directors are:—

R. Delacombe, White's Club, St. James' St., W.1.
Major J. J. Murphy, D.S.O., 162, Wymering Rd., W.9.
H. B. Randell, Hook Heath Lodge, Woking, Surrey.

Remuneration as fixed by the company. Regd. office:—161, Great Portland Street, W.1.

MORTGAGES, CHARGES & SATISFACTIONS

RENN, HOUNAM AND CO. LTD. (formerly Reliance Aircraft Co. Ltd.).—Particulars filed of £15,000 debentures authorised Apr. 12, 1923, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £8,000.

E. R. CALTHROP'S AERIAL PATENTS, LTD.—Debenture dated Apr. 18, 1923, to secure £1,000 charged on parachutes, accessories and materials then standing in the co.'s stores and the co.'s undertaking and property, present and future, including uncalled capital. Holder:—H. L. Nathan, 1, Finsbury Square, E.C.2.

AIRCRAFT DISPOSAL CO. LTD.—A memorandum of Satisfaction to the extent of £300,000 on Sept. 25, 1922, of debenture authorised by resolution of Mar. 5, 1920, securing £1,200,000. (Notice filed Apr. 30, 1923.)

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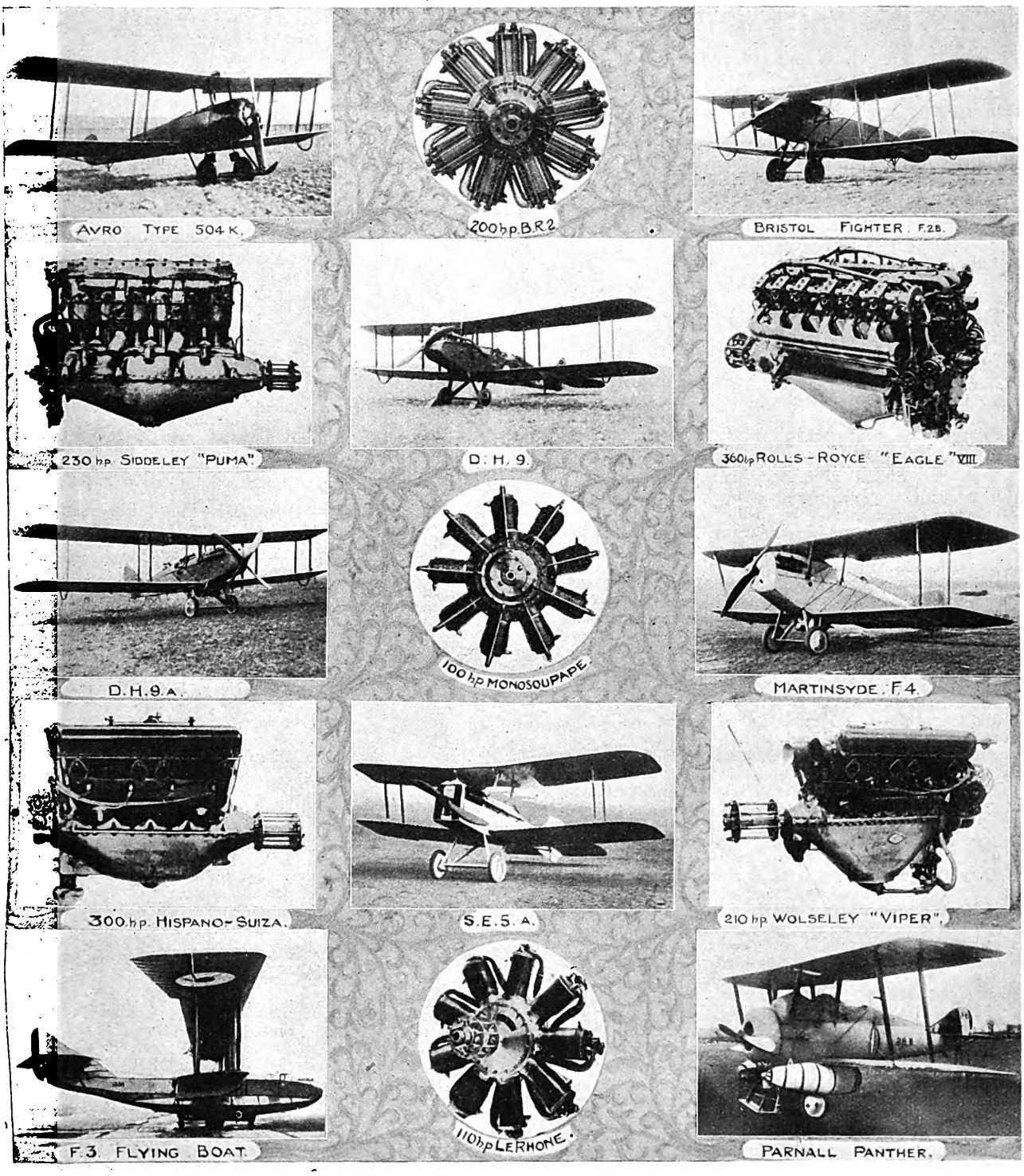
BRITISH ADC LIMITED AIRCRAFT

A SELECTION FROM OUR STOCK.



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REGENT HOUSE,

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(*Continued from page 376.*)

TENNIS :—Winners, R.A.F. Middle East Championship.
HOCKEY :—Runners up, R.A.F. Middle East Championship.
SWIMMING :—Winners, R.A.F. Middle East Championship.
CRICKET :—Runners up, R.A.F. Middle East Championship.

The R.A.F. (Middle East.)

The finals of the R.A.F. Tennis Tournament were played at the Gezireh Sporting Club on Nov. 14th and 15th with the following results :—

Men's Open Singles : F/Lt. R. W. Dawes, Aircraft Depot. F/O. V. F. Clarke, Engine Repair Depot.

Men's Handicap Singles : F/Lt. R. W. Dawes, Aircraft Depot. F/Lt. C. L. P. Mullany, H.Q., Egypt Group.

Ladies' Open Singles : Mrs. Fellowes. Mrs. Yool.

Ladies' Handicap Singles : Mrs. Grenfell. Mrs. MacFarlane.

Men's Open Doubles : F/Lt. R. Dawes and F/O. B. E. Godfrey, Aircraft Depot. S/Ldr. N. F. D. Buckeridge and W/Cdr. C. Fraser, H.Q., M.E. R.A.F.

Men's Handicap Doubles : F/Lt. R. W. Dawes and F/O. B. E. Godfrey, Aircraft Depot. Air Cmdre. B. C. H. Drew, H.Q. Egypt Group and F/Lt. J. C. M. Hay, No. 2 Armoured Car C.

Mixed Open Doubles : Wing/Cmdr. and Mrs. Fraser. S/Ldr. and Mrs. Buckeridge.

Mixed Handicap Doubles : F/Lt. and Mrs. Hay. S/Ldr. and Mrs. Roberts.

The Inter-Unit Cup was won by Aircraft Depot. The points gained by the first three units being as follows :—1st, Aircraft Depot—54. 2nd, H.Q. Middle East—10. 3rd, H.Q. Egyptian Group—8.

The Umpire's Prize was won by Lieut.-Col. E. G. Greenfield, H.Q. M.E. Mrs. Drew, wife of Air Cmdre. B. C. H. Drew, C.M.G., C.B.E., presented the prizes at the conclusion of the tournament.

R.A.F. Officers' Golfing Association.

SPRING MEETING. BERKHAMSTED.

21 teams (63 players) took part in the competition. Results were as follows :—

TEAM COMPETITIONS.—(3 players in each team). 18-Hole Medal Round. Scratch Prize. Kenley A, 249 gross score; Air Ministry, 260 gross score; Halton A, 264 gross score. Kenley A, 234 net score. Halton A, 236 net score (takes prize); Air Ministry, 241 net score

BEST INDIVIDUAL SCORE.—1st Division : F/Lt. A. Parr 79—6 = 73; F/Lt. Boumphrey 77 (scr.) = 77.

2nd Division : S/Ldr. Norton 82—13 = 69; W/Cmdr. Wise 84—12 = 72; S/Ldr. Cowtan 97—24 = 73; F/O. Burridge 87—12 = 75; A/Cmdre. E. C. R. Higgins 91—14 = 77.

FOURSOMES COMPETITION.—W/Cmdr. Wise (12), F/Lt. Craik (Scr.) 78—6 = 72; F/Lt. Hayward (+ 1), S/Ldr. Portal (18) 83—8½ = 74½.

36-HOLE ECLECTIC BOGEY COMPETITION.—F/Lt. Fawcus 8, 11 up; S/Ldr. Cowtan 22, 10 up; F/O. Carson 11, 9 up.

BEST MORNING ROUND.—1st Division : F/Lt. Hayward + 1, 3 up; F/Lt. Weare 4, 2 up. 2nd Division : F/Lt. Silly 18, 6 up; S/Ldr. Cowtan 22, 4 up.

BEST AFTERNOON ROUND.—1st Division : F/Lt. Fawcus 8, 7 up; S/Ldr. Norton 9, 5 up (takes prize). 2nd Division : F/O. Burridge 12, 4 up; F/O. Park 12, 2 up; F/Lt. Albrecht 14, 2 up; F/O. Carson 11, 2 up; F/O. Barnes 14, 2 up.

36-HOLE STROKE COMPETITION (36 Holes Scratch).—F/Lt. Hayward 74 + 83 = 157; W/Cmdr. Thomson 80 + 83 = 163; F/Lt. Boumphrey 83 + 83 = 166.

18-HOLE SCRATCH.—F/Lt. Hayward 74 + 1 = 75; W/Cmdr. Thomson 80 (takes prize); W/Cmdr. Peel-Ross 81; F/Lt. Fawcus 81.

36-HOLE HANDICAP.—F/Lt. Silly 183—32 = 151 (takes prize; S/Ldr. Norton 168—16 = 152; F/Lt. Butler 191—36 = 155; F/Lt. Day 195—40 = 155 (takes 2nd prize).

18-HOLE HANDICAP.—1st Division : S/Ldr. Norton 82—8 = 74; F/Lt. Hayward 74+1 = 75; F/Lt. Lees 83—8 = 75; F/Lt. Fawcus 81—6 = 75. 2nd Division : F/Lt. Butler 91—18 = 73 (takes prize), F/Lt. Silly 89—16 = 73; F/Lt. Day 96—20 = 76.

9-HOLE HANDICAP.—1st Division : F/Lt. Hayward 34 + ½ = 34½; F/Lt. Fenwick 40—5 = 35. 2nd Division : F/Lt. Silly 40—8 = 32; F/Lt. Butler 43—9 = 34; F/Lt. Day 45—10 = 35; F/Lt. Whitaker 44—8 = 36 (takes prize); F/Lt. Leslie 42—6 = 36 (best inward half).

At the conclusion of the meeting Mrs. G. H. Thomson kindly presented the prizes.

Inter-Service Golf.

R.N. v. R.A.F.—Played at Rye Golf Club on Apr. 16.

SINGLES.—Cmdr. F. R. Barry 0, F/Lt. C. H. Hayward (5 and 3) 1; Rev. E. S. Ulyat (6 and 5) 1, W/Cmdr. G. H. Thomson 0; Capt. R. S. MacFarlan 0, F/Lt. C. Boumphrey (3 and 2) 1; Cmdr. A. H. D. Field 0, F/Lt. D. Craik (3 and 1) 1; Lt.-Cmdr. A. F. Akhurst 0, A/Cmdre. E. D. Munro (3 and 1) 1; Surg.-Cmdr. A. C. Rusack 0, S/Ldr. J. C. N. Lowe (2 and 1) 1; Major R. A. D. Brooks (3 and 1) 1; F/Lt. N. W. Wadham 0; Cmdr. W. S. Gray 0, F/Lt. H. H. Clark (3 and 1) 1; Cmdr. P. H. Waterer ½, W/Cmdr. R. P. Ross ½; Cmdr. A. A. Scott 0, F/O. D. F. Fitzgibbon (1 up) 1; Lt.-Cmdr. J. B. Falls 0, F/Lt. F. G. C. Weare (2 and 1) 1; Cmdr. R. F. White (2 and 1) 1, F/O. Hope 0. (3½ to 8½).

FOURSOMES.—Barry and Ulyat (4 and 2) 1, Hayward and Thomson 0; MacFarlan and Field 0, Craik and Munro (1 up) 1; Arkhurst and Brooks (5 and 3) 1, Boumphrey and Clark 0; Rusack and Waterer (1 up) 1, Lowe and Fitzgibbon 0; Falls and Gray 0, Ross and Wadham (7 and 6) 1; Scott and White (4 and 3), 1; Weare and Hope 0. (4 to 2).

ARMY v. R.A.F.—Played at Swinley Forest Golf Club, Apr. 23.

SINGLES.—Maj. Boyd 0, F/Lt. Hayward (6 and 5) 1; Capt. Yerburgh 1, W/Cmdr. Thomson 0; Capt. Martin (4 and 2) 1, F/Lt. Boumphrey 0; Capt. A. R. Smith ½, F/Lt. Craik ½; Lt.-Col. W. Green (6 and 4) 1, A/Cmdre. D. Munro 0; Capt. Mirrlees (1 up) 1, S/Ldr. Lowe 0; Capt. Cummings (2 and 1) 1, F/O. Fitzgibbons 0; Lt. Aitken (4 and 2) 1, F/Lt. Clarke 0; Capt. Bretherton (9 and 8) 1, W/Cmdr. Peel-Ross 0; Capt. Parsons (1 up) 1, F/Lt. Weare 0; Maj. McMorgan (2 up) 1, F/Lt. Wadham 0; Capt. Adair (3 and 2) 1, F/Lt. Parr 0. (10½ to 1½).

FOURSOMES.—Boyd and Martin (2 and 1) 2, Hayward and Thomson 0; Green and Yerburgh (1 up) 2, Boumphrey and Lowe 0; Smith and Cummings (6 and 5) 2, Munro and Craik 0; Mirrlees and McMorgan (5 and 4) 2, Fitzgibbon and Weare 0; Aitken and Parsons (6 and 5) 2, Peel-Ross and Wadham 0; Adair and Bretherton (4 and 2) 2, Clarke and Parr 0. (12 to 0).

Cranwell.

BOYS' WING :—ASSOCIATION FOOTBALL : Boys' Wing (under 18) XI v. No. 1 School of T.T (Boys), Halton, at Halton on Apr. 14—won 3—1.

SKILL-AT-ARMS : "Hindle-James" Inter-Squadron Cup won by No. 3 Squadron.

STATION ASSOCIATION LEAGUE : Trophy won by No. 1 Sqdn., Boys' Wing.

R.A.F. STATION HOCKEY :— Apr. 7 v. Cleethorpes, home—lost 1—2.

R.A.F. CADET COLLEGE :—ATHLETICS : Apr 23, v. R.M.A., Woolwich, at Cranwell—lost 2—6.

SKILL-AT-ARMS : Apr. 22, v. R.M.A., Woolwich, at Cranwell—lost 13—14.

STATION SOCCER :—SOUTH LINCOLNSHIRE LEAGUE : Apr. 2, v. Boston Town, away—draw 0—0; 14, v. Boston West End, home—won 1—0; 19, v Spalding, away—lost 2—3; 21, v. Kirton Town, away—won 8—2; 28, v. Grantham Town, home—lost 1—3.

LINCOLN WEDNESDAY LEAGUE : Apr. 4, v. Lincolnians, home—won 4—1.

SOAMES CUP (SEMI-FINAL) : Apr. 23, v. Boston Town, away—lost 1—3.

NOTE.

All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

INCHINNAN AND EAST FORTUNE.

The Airship Station at Inchinnan, Renfrewshire, where the R.34 and R.36 were built, has been sold by the Disposals Board to Murray, McVinnie and Co., Ltd., who recently bought the Airship Station at East Fortune.

The sale in each case included the sheds, buildings, machinery and equipment.

AN R.A.F. CLUB FUNCTION.

The Cricket Committee of the R.A.F. Club gave a dinner on Apr. 30 at the Club, to the amateurs of the M.C.C. South African and New Zealand Touring XI's to signalise their successful return. The toast of the M.C.C. XI's was proposed by Maj. Young and Mr. H. D. G. Leveson-Gower, and replied to by Mr. A. C. MacLaren for the New Zealand side, and in the absence of Mr. Frank Mann, by Mr. Fender for the South African side.

Those present included :—R.A.F. Committee : Messrs. H. D. G. Leveson-Gower, General More, Maj. Young and Capt. Kiddy; South African XI : Messrs. P. G. H. Fender and A. E. R. Gilligan; New Zealand XI : A. C. MacLaren, Hon. F. S. G. Calthorpe, Hon. D. F. Brand, A. C. Wilkinson, Rev. H. D. Swan, W. W. Hill-Wood, and A. P. F. Chapman. Messrs. A. H. H. Gilligan and A. Jeacocke were also present.

THE R.A.F. CLUB CRICKET WEEK.

The R.A.F. Club Cricket Week, held last year at Eastbourne, will be held again this year at Hastings, the dates being Sept. 19-25 inclusive.

As before, two first-class fixtures are being arranged, but the actual matches to be played have not yet been decided upon.

The Band of the R.A.F. will play on the ground every day during matches.

Profits on the gate will again be devoted to the R.A.F. Memorial Fund.

The arrangements for the Week are in the hands of a committee consisting of Air Commodore F. C. Halahan, C.M.G., D.S.O., M.V.O., (Chairman); Capt. M. G. Kiddy (Hon. Sec.), and Messrs. H. D. G. Leveson-Gower, P. G. H. Fender, Hon. F. S. G. Calthorpe, and Maj. W. G. Young.

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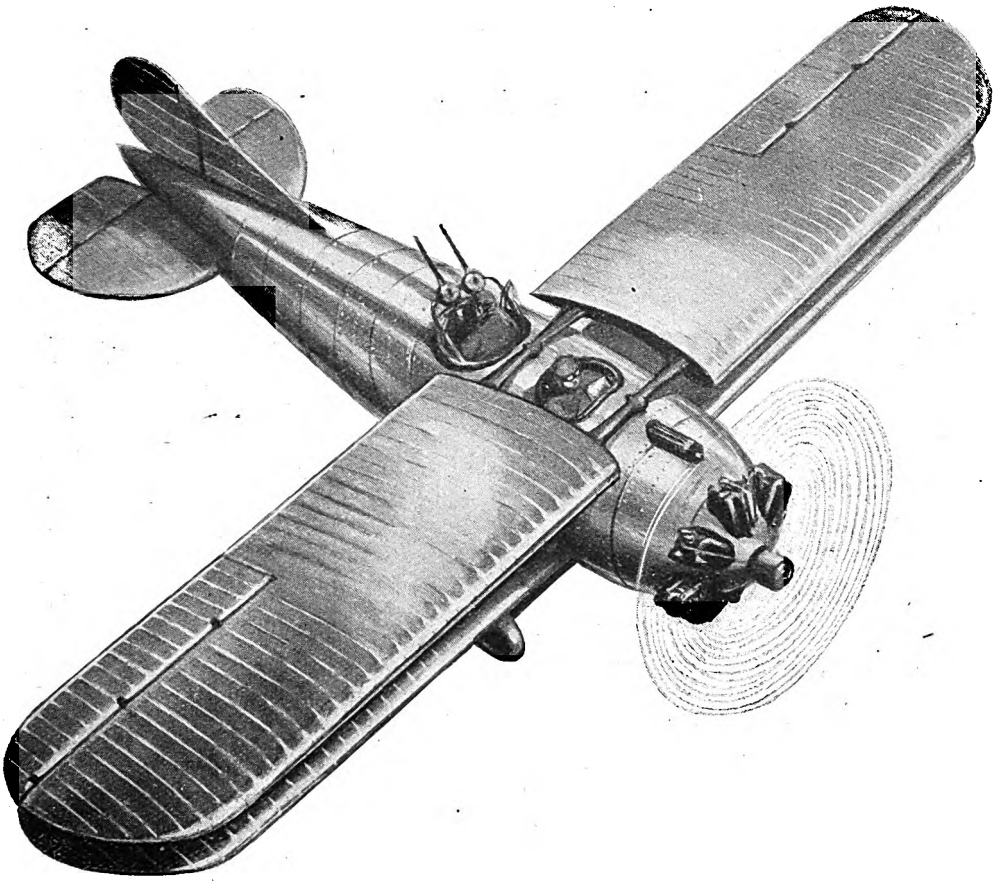
ALL-METAL

AEROPLANES AND SEAPLANES.

Designers and Constructors of All-Metal Aircraft for the British Government.



As a result of the most exhaustive tests carried out by the R.A.F. Factory on the "Short" All-Metal Aeroplane, Messrs. Short Bros. have now received an order for further machines of this type. When completed these machines will be the only All-Metal machines, that is to say, machines complete with metallic surfaces, to be made in Great Britain.

SHORT BROS.

(ROCHESTER & BEDFORD) LTD,

WHITEHALL HOUSE, 29-30, CHARING CROSS, LONDON, S.W.1.

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THE AIR MINISTRY'S HELICOPTER COMPETITION.

At last the Air Ministry has published the rules for its long-promised £50,000 prize competition. Those who compiled the rules are to be congratulated. If any machine completes the tests it will be worth having and if any machine attempts the tests it will be worth watching. Thus the rules combine instruction and amusement.

Incidentally the most amusing rule is No. 23, which decrees that Mr. Brennan's alleged helicopter, which has been abuilding for years at Farnborough with Air Ministry money, is not eligible for the competition. Can any enterprising M.P. extract from the Air Ministry a statement as to how much has been spent on this affair? It is said that it runs into many tens of thousands of pounds and that no real progress has been shown. It seems that the true reason for the Government's reticence is that it is ashamed to disclose how foolish it has been in its agreement with Mr. Brennan.

Apart from that the Air Ministry has been very wise in offering this prize. The offer entirely spikes any agitation on the part of helicopter maniacs. If any such want to know why helicopters are not being encouraged the reply is simply that there is £50,000 to be lifted by the machine which is capable of fulfilling certain conditions which after all would produce an aircraft which for practical purposes is considerably inferior to any modern aeroplane.

The conditions are as follows :—

The Air Council have decided, as announced by the Secretary of State for Air, to offer prizes amounting to £50,000 for the successful completion of certain flying tests applicable to a helicopter or equivalent type of flying machine.

The conditions of entry and the tests are as follows :—

1. The Air Council will subject to and in accordance with the Conditions of the Competition award prizes amounting to the sum of £50,000 in connection with the production of a flying machine which carries out independently of the existence of any buoyant structure or of power or assistance supplied from any source external to the machine and to the satisfaction of the Judging Committee appointed by the Air Council the tests specified in Condition 4.

2. All entries by persons intending to enter flying machines for the competition must be sent to the Secretary, Air Ministry, before Apr. 30, 1924. No entry received after Apr. 30, 1924, will be accepted.

3. Flying machines when undertaking the tests named in Condition 4 will be required to carry a pilot, sufficient fuel for one hour's flight and 150 pounds of military load.

4. The following are the tests to be undertaken by flying machines entered for the competition.

Test (a) The flying machine must make—

(i) In a ground wind not exceeding five miles per hour, and

(ii) In a ground wind exceeding ten miles per hour, but not exceeding 20 miles per hour

a vertical flight from a position of rest on the ground to a height of 2,000 feet and descend and land without damage

Test (b) The flying machine must make in a ground wind not less than five miles per hour and not exceeding twenty miles per hour a vertical flight from a position of rest on the ground to a height of 2,000 feet and remain in the air at an altitude of 2,000 feet for half an hour in a stable attitude over a ground area determined by the Judging Committee and thereafter descend and land without damage.

Test (c) The flying machine must make a vertical flight from a position of rest on the ground to a height of 2,000 feet and must fly over a prescribed closed circuit of not less than 20 miles in length at an approximate constant height of not less than 2,000 feet, and at an air speed of not less than 60 miles per hour and thereafter descend and land without damage.

Test (d) The flying machine must make in a ground wind not less than five miles per hour or exceeding 20 miles per hour a vertical flight from a position of rest and be manœuvred while in the air over a given ground point as directed by the Judging Committee and must descend vertically from a height of not less than 500 feet without engine, and alight without damage within a confined circular area on the ground having a radius of 100 feet and the given ground point as centre.

5. The term Vertical Flight in paragraph 4 means a flight executed from the starting point without appreciable divergence from a vertical line passing through such starting point.

6. A separate entry must be sent in respect of each flying machine intended to be entered for the competition. The Air Council reserve the right to refuse any entry sent in.

7. Entries must be made by the owner or owners of the flying machine upon the form of entry provided by the Air Council, and must state the name, address, profession and nationality of the owner or owners and the names, addresses and nationality of any other person or persons having an interest in the machine.

8. Entrants will be required as a condition of the acceptance by the Air Council of the entry to furnish the Air Council with their written acceptance of the conditions of the competition together with the written consent to the entry and acceptance of the Conditions of the Competition of any person or persons having an interest in the flying machine entered

9. Entrants must also if called upon to do so furnish the Air Council with such further document declaration or other evidence as the Air Council may require to satisfy them that the entry is made with the consent of any person or persons having an interest in the flying machine entered and that such person or persons accept and agree to be bound by the Conditions of the Competition

10. The Air Council reserve the right to add to or alter any of the conditions of the Competition other than the tests to be undertaken by flying machines and the amounts of the prizes to be awarded for each test.

11. Each entrant must at the time of entry furnish particulars of all patents which have been applied for or granted and of all designs for which registration has been applied for or granted in respect of inventions or designs embodied or made use of in or in connection with the flying machine entered.

12. Each entrant must at the time of entry furnish the Air Council with a description and general arrangement drawings of the flying machine entered and must give such further information in regard thereto as may be required by the Air Council, and at the conclusion of any test named in Condition 4 the Air Council or any person or persons appointed by them shall be at liberty to examine any flying machine which has undergone the test and to take records for the use of the Air Ministry of such measurements particulars and details as may be desired and the entrant, his servants and agents shall afford all reasonable facilities and assistance for the purpose.

13. The Air Council will in due course after the date on which entries close proceed with the tests of flying machines which have been entered for the competition and will notify entrants of the time and place appointed for tests of the machines entered by them but no time and place will be notified to the entrant of any machine and no test of any machine will be held until all the conditions of the Competition required to be fulfilled by the entrant of such machine have been complied with.

14. In the event of any one of the four tests named in Condition 4 not having been held in respect of any flying machine entered for the Competition within a period of 12 months from the date on which entries close such machine shall be deemed to be withdrawn from the Competition by the entrant as respects any test or tests which have not then been held in respect of the machine and the machine shall be disqualified from competing further for any prize other than the prize or prizes (if any) allocated under Condition 19 in respect of the test or tests which the machine has carried out.

15. The tests named in Condition 4 will be carried out under the control and direction of the Judging Committee appointed by the Air Council and the Judging Committee may make such rules with regard to the conduct and carrying out of the tests or any of them (including disqualification of competing machines as they may think necessary. All instructions given to entrants or their servants or agents by the Judging Committee and all rules made by them will be duly observed by entrants and their servants or agents.

16. The decision of the Judging Committee appointed by the Air Council on any matter connected with the tests or the allocation of the prizes and the decision of the Air Council on any other matter concerned with or arising out of the Competition shall be final and without appeal.

17. No application by entrants for financial assistance from public funds will be entertained by the Air Council who will undertake no responsibility in respect of any expenses incurred by entrants in connection with the design, construction, transport or test of flying machines entered by them. All such expenses (including travelling and other expenses of the Judging Committee appointed by the Air Council in any case in which an entrant obtains the consent of the Air Council to the test of the entrant's machine being held at some place other than that originally appointed by the Air Council) must be borne by the entrant.

18. Flying machines entered for the competition will at all times be under the charge and control of the entrant, and no liability will be accepted by the Air Council for injury or damage to person or property caused to or by the entrant of any machine or any person or persons having an interest in the machine or his or their servants or agents in connection with the competition.

19. The prizes in connection with the competition will be as follows: Subject to and in accordance with the Conditions of the Competition :

(i) A sum of £5,000 will be awarded in respect of test (a) named in Condition 4.

(ii) A further sum of £15,000 will be awarded in respect of tests (a) and (b) named in Condition 4.

(iii) A further sum of £20,000 will be awarded in respect of tests (a) and (c) named in Condition 4.

and (iv) A further sum of £10,000 will be awarded in respect of tests (a) and (d) named in Condition 4.

20. The prizes named in Condition 19 will be awarded to the entrants of flying machines which are submitted for tests in accordance with the conditions of the competition at the appointed time and place and which successfully and to the satisfaction of the Judging Committee appointed by the Air Council carry out the tests specified in the presence of and under the direction of the Judging Committee.

21. In the event of two or more flying machines successfully and to the satisfaction of the Judging Committee appointed by the Air Council carrying out any test or tests for which a separate prize is allocated under Condition 19 (i), (ii), (iii) and (iv) the prize allocated for such test or tests will be divided equally or in such proportions as the Judging Committee may determine between the entrants of the successful machines.

22. The Air Council shall not be bound to recognise any claim right or interest of any person or persons having an interest in any flying machine entered for the Competition other than the entrant of the machine and the receipt of the entrant shall be a sufficient discharge for any payment made by the Air Ministry in respect of any prize or share of a prize awarded.

23. No part of the above-mentioned prizes will be awarded in respect of the helicopter now being constructed by Louis Brennan, Esq., C.B., for and on behalf of the Air Council.

24. In the event of any of the prizes not being awarded such prize will again be offered for competition within a further period of one year from the date of the announcement by the Air Council of the result of the original tests upon terms to be then announced.

25. All communications in respect of the competition should be addressed to the Secretary, Air Ministry, Adastral House, Kingsway, London, W.C.2.

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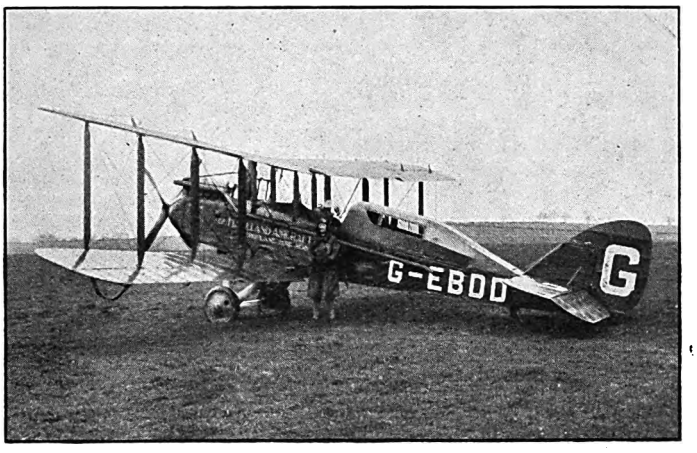
DE HAVILLAND AEROPLANES.



The D.H.9c.—Using machines of this type exclusively, The DE HAVILLAND AEROPLANE HIRE SERVICE has already completed over a quarter of a million miles, running at a fare to the hirer of 2/- per mile.

The DE HAVILLAND AIRCRAFT Co., Ltd.,
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AVIATION IN SOUTH AMERICA.

By A. K. Luke.

[The following particulars concerning aviation in South America form the bulk of a lecture given to the Scottish Branch of the Royal Aeronautical Society by Mr. A. K. Luke on Mar. 5 shortly after his return from a business tour of the South American republics. They should be of very high value to British Aircraft Constructors and to the Air Ministry alike as showing how business may be done and how the Government can help in doing it if money be spent in fostering foreign trade instead of on subsidies, conferences and other non-productive objects. Mr. Luke deserves congratulations on his keen observation and business acumen as well as on the patriotism which has led him to put so much valuable information at the disposal of the Aircraft Trade instead of keeping it for his personal and private profit.—C. G. G.]

Argentina.

The Argentine Republic is the second largest in South America, and has a population of 9,500,000, of which 2,275,000 are to be found in the Province of Buenos Aires.

Great enthusiasm was shown during 1919 and 1920 in aviation generally, but in 1921 this dwindled somewhat, owing chiefly to the general crisis which swept the country, and also to the failure of the French and Italian Missions to weather the storm.

1922 saw a recrudescence of interest, due mainly to the initiative of the Army Aviation Authorities, who put forward a scheme for the establishment of air routes throughout the Republic. The hub of these services was to be at the Military Aerodrome of El Palomar, the spokes leading to outlying stations to be created at Monte Caseres, Rosario, Salta, Cordoba, Mendoza, Neuquen and Gallegos, besides which 22 secondary stations and 126 emergency landing grounds were projected. The negotiations between the Ministry of War, the Postal Department and the Ministry of Commerce, in regard to this project, were still in progress at the time of my departure.

Military Aviation has made great progress, being well-organised and equipped with modern craft. The training at El Palomar is most efficiently carried out, and real merit is to be found among the Instructing Officers and Pilots. I would like to mention specially Captains Zanni and Parodi, two of Argentina's most capable pioneers, who, by their enthusiasm and example, have done much to vulgarise Aviation in their country. They were among the first and few pilots who successfully flew over the Cordillera de los Andes to Chili and back, and this is no mean achievement.

At the recent Manœuvres three squadrons, 1 Bombing, 1 Fighting and 1 Reconnaissance and Spotting, took part, and it was considered by Military Attachés present that a degree of efficiency was shown equal to that to be found amongst many European countries to-day, and while the Brazilian Air Force is numerically stronger than that of Argentine, it is not, as yet, nearly so well-trained.

The Naval Air Force is not so far advanced as that of the Army. Training is carried on at San Fernando, the seaplane station, but it would appear that the Army has a much greater pull on the purse-strings of the Nation than the Navy. The machines in use are nearly all Curtiss flying boats, but there are also a few French machines.

Buenos Aires reminds me very much of Pekin. The latter city is full of people trying to negotiate loans to the Chinese Government, while the former is full of people wanting to secure air concessions from the Government. The great similarity between the two is that neither succeed in their ambition. The reason for this negative result in both cases can be summed up in two words "Insufficient Bukshish."

The British, French and Italians seem to be anxious to start freight, passenger and mail services to various parts of the country, provided that they are given the exclusive right to exploit their chosen route, but the Government does not appear willing to grant such rights.

Major Kingsley, formerly an R.A.F. officer, arrived in the country in 1919 and formed a company called the Sociedad Rio Platense de Aviacón. This company has operated for the last two years a successful cross-river service between Buenos Aires and Montevideo carrying mails and passengers. The service has only been worked during the summer months, the rest of the time being taken up with joy-rides and the training of pilots, and the company possesses an excellent 'drome at S. Isidro. Last season it was found that the distance from the town to the aerodrome, some 40 minutes by electric car or an hour and a-quarter by motor-car, over what are termed roads, was often too much for a prospective passenger to face. The same time was lost at the Montevideo end.

To remedy this, Major Kingsley visited England during the Winter (our Summer) and purchased a number of seaplanes (Vickers' amphibians), so that in future the service will start from the North Basin, Buenos Aires, and finish in the Harbour at Montevideo, and vice versa. This means that the journey will be done in one hour and 30 minutes from hotel to hotel as against two hours and 25 minutes, a very considerable saving.

This new service should be of great commercial utility. The actual flying time should not exceed 65 minutes, and, always provided that the fares charged are not too high, the line will be patronised and become a paying proposition.

Another source of revenue to this company is the private chartering of aeroplanes by rich Estancieros to take them back from the Capital to their estancias. By train such a journey often takes 24 hours, after which there may be a four- or five-hours' ride on horseback. By aeroplane the whole distance can be done in four or five hours, and the question of a landing-ground, as a rule, presents no difficulty owing to the general flatness of the country.

Altogether, the Rio Platense Co., since its foundation, has carried nearly 15,000 passengers and flown over 400,000 kilometres, a very creditable performance.

Another company, started by the Italian Constructor Caproni, called The Italo-Argentine Aerobus Co. "Caproni," intends opening a service between Buenos Aires and Montevideo. It is alleged that they are to use giant Capronis carrying 23 passengers and 3½ tons of cargo, but I think that this is doubtful.

The German-Spanish scheme for a Zeppelin line from Seville to Buenos Aires is beginning to take shape. The service is to be maintained by two dirigibles having 135,000 cubic metres' capacity, measuring 250 metres long and 34 metres in diameter. They are to have accommodation for 40 passengers and eleven tons of cargo. The duration of the voyage is to be 3½ days westward and four days eastward, and the fare will be Ptas. 6,000 or £200. Air ports are in course of construction at the two termini and include hangars 300 metres long and 50 metres high. Both ports are well equipped with shops for undertaking repairs, and will also have wireless.

Capt. René Fonck, who paid a visit to the Argentine after Brazil, outlined a scheme for an aeroplane service from Paris to Buenos Aires. A committee of influential people was formed to study the best means of carrying it out, but that is as far as it has got, and probably as far as it ever will get. But the idea served the purpose for which it was intended excellently well, and that was to draw the attention of the Government and the people to the products of the French Aircraft Constructor.

Uruguay.

Uruguay, with a population of only a million and a-half, and an area of 72,210 sq. miles, is the smallest of all the South American Republics. Actually there is no Air Service, either Naval or Military, that could be called as such, but the Army possess a few obsolete British and French machines, mainly used for training purposes, the purchase of the former being the result of the good pioneering work done by Major Scott, an ex-R.A.F. officer, on an Avro in 1919.

There is a Military Aviation School near Montevideo, and the Head of this School has just returned from a mission to France, where he purchased six new Nieuports and a quantity of spare parts to the total value of half a million francs. This may not seem a great deal, but as their standing Army only amounts to 10,000 officers and men, it is sufficient to form the nucleus of an efficient Military Air Service.

An Air Convention has been signed between the Uruguayan and Argentine Governments regulating the traffic between the two capitals, and the negotiations between the Postal Authorities of the two countries have been brought to a satisfactory conclusion. On the first trip from Buenos Aires to Montevideo, after the completion of the negotiations, 1,270 letters were carried.

The possibilities of successfully running aeroplane or seaplane services in Uruguay itself, for mail or passenger traffic, are not good. The railway and telegraph communications with the interior are admittedly bad, but on the other hand, the population in the country districts is scanty, for out of the total population of 1,500,000, a third of this is in Montevideo itself.

An international service from Montevideo to Asuncion, the Capital of Paraguay, with halts at Colonia (Uruguay), Paraña (Argentina), Corrientes (Argentina) and Formosa (Paraguay), might be a paying proposition for the future, though ambitious, I admit.

There have been no definite Aviation Missions to Uruguay, though in 1919 the French and Italian Missions to the Argentine gave exhibition flights. The Army, however, is trained on French lines, and the uniforms are almost identical with those seen in France in pre-War days, so that it can be taken that the predominating influence is French.

There are no aviation transport companies in existence yet, but tentative schemes for a service to Buenos Aires, and another to Rio Grande del Sul and Porto Alegre, have been mooted from time to time, though nothing has so far matured.

(To be continued.)

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PERSONAL NOTICES.

DEATH.

THICKETT.—On Wednesday, May 9, 1923, Harry, aged 27 years, the beloved husband of Elsie Marguerite, and only son of Mr. and Mrs. W. H. Thickett, Kylemore, Grimsby, Uppingham School, 1908-1914, late King's Own Royal Lancaster Regt. and the Royal Air Force.

IN MEMORIAM

RHODES-MOORHOUSE.—In proud and most loving memory of William Barnard Rhodes Rhodes-Moorhouse, V.C., who died at Merville, in France, on Apr. 27, 1915, from wounds received the day before when bombing Courtrai Junction.

ENGAGEMENTS.

ADELEY—FOX.—A marriage has been arranged between Maj. Gerald Graham Adeley, 1st R.U. Rifles and R.A.F., younger son of Mr. and Mrs. Adeley, Ben Eadan, Belfast, and Eileen Norah, only daughter of Dr. and Mrs. Wilfrid S. Fox, 63, Grosvenor Street, W.

CATCHPOLE—GLOVER.—The engagement is announced between Basil Everard Catchpole, M.C., D.F.C. (late R.A.F.), third son of Mr. and Mrs. Arthur E. Catchpole, of Hatzic, B.C., and Elsie, younger daughter of Mr. and Mrs. Fred B. Glover, of Hillside, 11, Arkwright Road, Hampstead

DAVIES—WILSON.—The engagement is announced of Douglas A. Davies, D.F.C. (late 1/4th Wilts Regt. and R.A.F.), eldest son of Mr. and Mrs. Arthur Davies, of Harrow, to Muriel, daughter of the late Edward Wilson, J.P., and Mrs Wilson, formerly of Hawick, N.B., and 19, Netherhall Gardens, N.W.

HARTMAN—DISCOMBE.—The engagement is announced of Capt. Frederick William Hartman, late R.E., attached R.N.A.S., of 26, Albemarle Street, only surviving son of Mr. and Mrs. Augustus Hartman, of 14, Kensington Square, W., and Tyting, Aldwick, Sussex, and Dorothy Ailsa, only daughter of the late Mr. George Hart Discombe and Mrs. Discombe, of 20, Edith Grove, Chelsea.

JONES—HODGSON.—The marrange arranged between Mr. H. A. Jones, M.C., Croix de Guerre, late director of the Air Historical Branch, and Miss Doris A. C. Hodgson, L.R.A.M., A.R.C.M., will take place at Bishopstone on June 2.

KNOCKER—LAMB.—The engagement is announced of Guy Mainwaring Knocker, R.A.F., only son of Col. and Mrs. C. G. Knocker, of Folkestone, and Cynthia Mary, only daughter of Mr. and Mrs. Charles Burgoyne Lamb, Inholms, Tadcaster.

SMITHSON—GLADWIN.—The engagement is announced between F/O. J. G. Smithson, R.A.F., son of Mr. and Mrs. J. Smithson, of Norbiton, and Kathleen, daughter of Mr. and Mrs. Jack Gladwin, of Kingston-on-Thames

MARRIAGE.

HUNTER—STOODLEY.—On May 10, at St. Alban's Church, Bristol, by the Rev. L. G. Vining, F/Lt. Paul Bernard Hunter, R.A.F., younger son of Mr. and Mrs. Percy Hunter, Teddington, to Evelyn Mary, second daughter of the late Mr. E. E. Stoodley, C.B., of Teddington, and Mrs. Stoodley, 14, Cambridge Park, Bristol.

BIRTHS.

COOPER.—An Apr. 20, at 57, Sanghall Road, Chester, to Doris, wife of F/O S. H. Cooper, 20 Sqdn., R.A.F.—a son.

HUBERT.—On Apr. 22, to Charles and Betty Hubert, at 2, Passage Lenotre, Le Vesinet, Seine et Oise—a son.

COMMERCIAL AERONAUTICS.

Owing to the exigencies of the Postal Service the Air Line Statistics are not available. They will be published in the next issue.

Croydon Notes.

Croydon has been quite busy over the Whitsun Holidays in spite of the not too good weather.

The first German Air Line machine arrived at Croydon on Monday last. This was an all-metal Dornier monoplane, piloted by Herr Kahlow. It arrived at Croydon at 20.00 hrs. after stops at Hamburg, Bremen and Amsterdam.

Sir Samuel Hoare, the Air Minister, and Lady Maud Hoare, accompanied by Sir Sefton Brancker (on the box seat), started off for a tour of the air routes on Thursday. The first section was to Rotterdam in a Daimler D.H.34 G-EBBQ, piloted by Mr. Hinchliffe. The Editor of THE AEROPLANE and "Herself" also travelled in this machine.

The Daimler Airway have recently been carrying some more bullion as freight and one understands that on one day about £100,000 in gold bar was transported. It was divided up between two Fokkers and one D.H.34 presumably on the principle of not putting all one's eggs into a single basket.

Handley Page Transport are still carrying loads of 13 and 14 passengers with which the W.8bs leap off the ground like scouts. On Saturday one met G-EBBG out in the direction of the Crystal Palace presumably on a test flight.

Sir John and Lady Simon flew to Paris in a Handley Page for the Whitsun Holidays.

The Instone Air Line are getting a large number of passengers and the non-stop machines to Cologne are being well patronised.

Mr. Roberston had a busy day on Wednesday. He left Croydon at 06.12 hrs. on G-EBBQ for Manchester. He was back at Croydon at 11.00 hrs. and left on the same machine for Amsterdam at 12.25 hrs. and returned to Croydon at 20.00 hrs.

The Trust House has now opened its new premises and one is sure that Mr. Lloyd will now establish a new régime which will completely obliterate all memories of the distant past.

G. D.

A WORLD'S RECORD-BREAKER.—The famous Liberty-engined Fokker biplane which has recently flown non-stop from the Atlantic to the Pacific piloted by Lieuts. Macready and Kelly, U.S. Air Service. Here Mr. Fokker himself is seen after piloting it on its first test flight.

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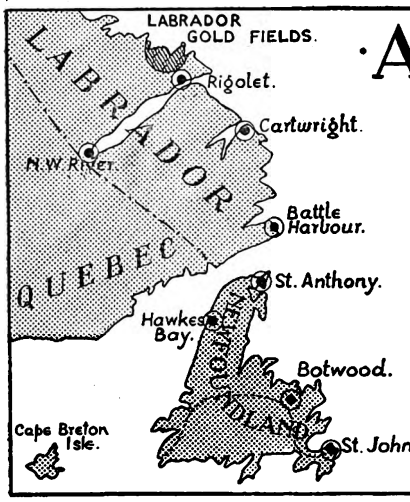

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ON OUR NEW CABINET MINISTER.

It was announced last week that with the formation of Mr. Stanley Baldwin's new Cabinet the Secretary of State for Air becomes a member of the Cabinet. This alteration definitely raises the status of the Royal Air Force to a level with that of the Army and Navy. Hitherto although the Air Minister has been officially "One of His Majesty's Principal Secretaries of State" he has not been in fact a Cabinet Minister and this curious anomaly has naturally reflected on the Air Force, which has been unrepresented in the Cabinet when Service matters have been under discussion.

When Mr. Churchill was in the Cabinet there was no doubt that air affairs were given their fair share of consideration but under Mr. Bonar Law there were distinct signs of inadequate appreciation of the importance of the Air Force despite Sir Samuel Hoare's best endeavours. Now we may look for a very different state of affairs.

Sir Samuel has already won the highest esteem of all who serve under him, thanks to his directness of method and unmistakable honesty of purpose. His genuine worth is recognised even by his political opponents. Among the most appreciative of his critics is his predecessor Captain Frederic Guest who only a few days ago expressed to a mutual friend the high regard which he has for Sir Samuel Hoare and the good work he has done since he came into office. When a political opponent says that a Minister is the best possible man for the job there is reason to believe the statement

By including the Air Minister in the Cabinet Mr. Baldwin has enhanced his own reputation in that he has shown that he understands the proper position of the Royal Air Force and the importance of air development in general. Which is natural in view of the interest which he has shown in Aviation in the past. Though he has taken no public part in aeronautical affairs one has evidence that he has been personally interested in flying for many years. In fact at one time soon after the War he seriously discussed the possibility of maintaining a private aeroplane and pilot to accelerate journeys between Town and his constituency. Perhaps it is as well that he did not do so in those early days of Civil Aviation for we might have lost one who promises to be a very good Prime Minister.

As it is we owe him a debt of gratitude for his prompt recognition of the rights of Aviation. And it is certain that in Sir Samuel Hoare he has added to his Cabinet one who by intellect and by training will be of great value in the deliberations of those who govern the Nation's affairs.—

C. G. G.

ON CIVIL AVIATION AGAIN.

In a few weeks' time we shall be in the midst of the International Air Congress which is to take place during the last week of June, and as the said Congress will be chiefly concerned with international Civil Aviation it seems necessary to discuss the subject further despite the greater importance of the expansion of the Royal Air Force to the One-Power Standard advocated by Lord Birkenhead. As a matter of fact the International Congress will be of considerable importance in its way for it will certainly bring to this country a number of people who influence public and aeronautical opinion in their own countries though they may not actually come rushing with cheques in their pockets to buy British aeroplanes. Therefore one hopes that our foreign visitors will be entertained in a way which will give them a good impression of the English people and of English Aviation—one uses the word English advisedly for other than a few very excellent pilots and engineers there is no Scottish, Welsh or Irish Aviation.

So far one is not impressed by the work of those who have undertaken the organisation of the Conference. It is true that there is to be a reception by the Duke of York, which will certainly be a charming occasion. And there is to be another reception at the Mansion House by the Lord Mayor of London, which will equally certainly be monumentally dull and oppressive rather than impressive. And there is to be a banquet on the last day of the Conference after the R.A.F. Pageant—provided that anybody manages to get through the traffic from the Pageant in time to dress for the banquet, and as in previous years it has been proved to be impossible to dine before 21.30 hrs. on Pageant night one rather expects the banquet to be a somewhat disorganised affair. But somehow there seems to be a lack of initiative, *élan*, or something about the way the affair is being made known to the world.

Ineffectual Publicity.

Circulars and letters and things have been sent to most people connected with Aviation in this country but personally one finds that, like the majority of stage plays, they "fail to attract." Only a few days ago a poster advertising the Conference was sent to this office with a request that it should be displayed on the premises. The poster is the kind of thing one would expect to be turned out by a jobbing printer to advertise a provincial haberdasher's sale or a country cycle-race meeting. No doubt the printer has done his best for the money the organisers were prepared to spend. The fault is quite obviously that more money should have been spent on it or else none at all. When one thinks of how elegantly the same thing would have been done in any Continental country or of the impressively dignified way in which it might have been done by some people in this country one feels inclined to weep for the banality of the whole business.

Perhaps one is hypercritical in that one would like to see our foreign visitors overwhelmingly impressed by the solidity and dignity of our English methods. Or perhaps it is only an over-developed editorial instinct—for one is sure that some day one will want to get out and edit the inscription on one's own coffin-plate. But one has all along had the feeling that the Congress is being inadequately handled and is likely to fall short of its possibilities. Either the thing ought to be done on first-class lines or not at all.

However, the Conference is going to happen so we may as well make the best of it, and one hopes that everyone concerned with Aviation will send his or her guinea subscription to the office of the Organising Committee, which is the office of the Royal Aeronautical Society at 7, Albemarle Street, Piccadilly, London, W.1. If enough guineas are forthcoming the organisers may be able to make a showing approximately worthy of English Aviation when the time comes.

International Air Traffic.

Presumably one of the subjects which will cause most discussion during the Congress Week, unofficially at any rate, will be the still-to-be-arranged Million Pound Monopoly Company. For it is generally recognised that if adequately organised the official English air line will soon dominate air traffic on the Continent just as English shipping dominates the Seven Seas. Already our air lines have set a standard of regularity and reliability which is unapproached by any other nation in spite of the huge French subsidies and the advantages of climate and topographic features in other countries. If our air lines can get going next year with something like adequate Government backing we shall simply acquire the whole of the World's air traffic.

And the other countries know it. For example one heard only a few days ago that although the French have made a very favourable arrangement with the Czecho-Slovaks for their line from Paris to Prague the Czechs themselves are anxiously waiting for the extension of an English line to that city so that they may learn how an air line ought to be run.

The English Way.

The thing that impresses the foreigner more than anything is the combined casualness and solidity of our English methods. For example the other day a Daimler pilot was standing by his machine on the Rotterdam aerodrome waiting for his passengers when another De Havilland machine passed overhead. In response to the question of a Dutch

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friend he merely glanced up and remarked "Oh! That's Robertson from Berlin to London" and went on with his conversation. The Dutchman, a man of high intelligence, was impressed by the idea that a man should in our own time be flying from Berlin to London in the day. The Englishman merely accepted in his casual way the solidity of the Daimler Airway organisation which decreed that he or any other pilot should fly from Berlin to London.

Our attitude is rather that of the Chinese mandarin who was talking to a European in Pekin when an aeroplane flew over them. The European, thinking to impress the Chinaman, said—"Isn't that wonderful?" The mandarin with five thousand years of true civilisation behind him merely replied,—"Why? It is meant to do that, isn't it?" If a thing does what it is meant to do, why get excited about it? Which is why one fails to find any thrill in radio-telephony, commonly called "wireless," and why one prefers to put good records on a gramophone rather than listen to bad concerts from a broadcasting station. The thing is meant to do that and at present does it rather feebly. None of man's comic little inventions is half as wonderful as just being alive. So why worry? The utmost we can do is to try and bring our comic little inventions a trifle nearer perfection.

One Air Line or Two.

Now, if our English air lines are to get going next year it is time that something was settled about them. Apparently there is no definite offer as yet from any new group of capitalists who wish to rush into Civil Aviation. And one has good reason to believe that there is no hope of an amalgamation of the four existing lines, Daimler, Handley Page, Instone and Supermarine. Three of them or two of them might come to an agreement but it seems that there is always one which stands out for conditions unacceptable to the rest.

Might there not be a possibility of the Air Ministry altering the scheme put forward by the Hambling Committee and consenting to subsidising two companies, one to run the Northern routes (Berlin, Cologne, etc.), and the other the Southern routes (Paris, Marseilles, and the Mediterranean generally)? There seems to be some chance of getting the four existing air lines to come to some agreement on such a scheme.

Two lines competing for efficiency but not competing for goods and passenger traffic ought to satisfy both the parties, namely those who argue that competition is good for trade and those who argue that our English air lines should compete against foreigners but not against one another. Whether such a suggestion has been put to our Air Minister or not one has no idea, but one puts it to the World at large as worth considering.

Modes and Methods.

One great advantage of having two lines would be that it would abolish the danger of a single line fixing on one type of aeroplane and engine and standardising it to the detriment of progress. Obviously one big firm, if it wanted to get back its shareholders' money, could not afford to run various different types of machines with consequent complications in its stores and repair shops.

Two lines running over different types of country would almost certainly use different types of aircraft. And they would probably work on different methods, being under different management.

We see that much to-day in that the Daimler Airway with its intensive flying and high efficiency ideals works on lines which are quite different from those of the Handley Page and Instone lines. Each is successful in its own way and when viewed from different stand-points. But one would hate to say that any one of them is so nearly right in its methods as to make those methods an absolute standard for a single air-line holding a monopoly of all routes. And in addition there is the De Havilland Hire Service which working on quite different methods makes a success of itself without any subsidy at all.

A Personal Experience.

Recently one had a slight experience of air transport which has given one some fresh views on the subject which may be worth recording as bearing on this question. By courtesy of the Daimler Airway Herself and oneself were given a trip to Rotterdam in a D.H.34, and by good fortune we had the honour of travelling in the same machine which carried the Air Minister and Lady Maude Hoare and the Director of Civil Aviation, who, as he put it, travelled on the box seat.

Sir Samuel Hoare being on official duty and being oneself on a holiday naturally one did not bother the Secretary of State for an interview so one has nothing to say as to his views, but his presence in the machine materially influenced one's own views.

Our pilot was Mr. Hinchliffe and if there is a better pilot in Service or Civil Aviation one has still to meet him. There will be more to say about his methods hereafter.

Our Napier "Lion" engine ran like a clock of the best English make—none of your American or German imitations—and never so much as coughed from the time it was started at Croydon till it landed us at Rotterdam. Even when taxying across the aerodromes when the throttle was being intermittently opened and closed the revolutions went up and down with the smoothness of a well-behaved dynamo. And the engine did not seem to care whether it was sucking in pure sun-lit air over the clouds or the saturated cloud-vapour itself or virulent rain-water under the clouds. There is no doubt that the Napier engine as maintained in the workshops of the Daimler Airway is a beautiful piece of mechanism.

Our aeroplane was a standard D.H.34, old G-EBBQ, not such a veteran as G-EBBS but one of considerable experience. It would be hard to imagine a more comfortable machine in which to travel. The ventilation is fully adequate and so are the heating arrangements, for at no time did one feel cold. (No, not even about the feet.) The seats are of necessity rather crowded together but they are very comfortable and are skilfully designed to give plenty of leg-room when one is seated. They could however be improved by making the backs higher and less sloped. And evidently the machine handles beautifully for even the worst bumps seemed to call only for the slightest movement of the ailerons. Altogether the D.H.34 is a delightful vehicle

A Cross-Channel Journey.

The machine left Croydon at 09.30 with clocklike accuracy and without any more fuss than was necessary to photograph and kinematograph the official party. There was no trouble or delay over passport or Customs formalities. The passport official cast one hurried and horrified glance at one's passport photograph and almost threw it away from him—naturally. The Daimler Airway officials handled the baggage with military precision and despatch and that was that.

It had been raining heavily earlier in the morning and the clouds had gone on ahead, so we left in bright sunlight. Mr. Hinchliffe took the machine up in a big climbing turn to 1,000 feet without a jerk or a bump although it was blowing hard. Within thirty miles we began to overtake the clouds so the pilot climbed steadily to 4,000 feet evidently hoping for clear weather and the 6,000 foot level across the Channel. That part of the trip was ideal for the cloud scenery was of the finest, rather better in fact than the best thing in Alps, and the fields below were clear and sunlit through the gaps in the clouds.

But as we sighted Dover we found a solid black mass over the Channel with just a line of silver sea between the cliff top and the clouds. So down went the nose of the machine into what looked rather like a horizontal crack in a door with the light behind it, and we scraped in under the cloud-bank at a bare 1,000 feet—which with some 300 feet of cliff below brought us nearer to the ground than is comfortable and caused some little bumpiness. And at or below 1,000 feet we crossed the Channel.

Lack of Organisation.

This was nobody's fault. Mr. Hinchliffe would obviously have preferred 6,000 feet, with a consequent glide of ten miles or so in case of engine failure. But the cloud-bank was such that he would have had to go considerably higher than that to get over it and would then probably have found himself over a cloud-carpet without any view of the ground when he got to the other side of the Channel and nothing to tell him when there whether the clouds were down to the ground or not. For, as one has constantly tried to drum into the heads of our and the French Civil Aviation authorities, there is no proper system of ground observation, corresponding to signal-boxes on the railways, to tell pilots whether the ground is clear or not, and there is no system of directional wireless to keep tab on their position.

At present the pilot tells the terminal ground stations by wireless where he is, which is merely silly. Its only use is to tell the Air Ministry where to fish for him if he falls into the Channel. Under any sane and sensible Civil Aviation organisation properly located ground stations would give the pilot his position when out of sight of land over the clouds and would tell him where there was clear landing air under the clouds and where the clouds were so low as to form fog on the ground. The wireless arrangements of to-day only give the pilot information about the weather at terminal stations, with the exception of Lympne on our side of the Channel and (sometimes) St. Inglevert on the French side.

French wireless is still intermittent and unreliable and badly organised. Weather observation posts or signal-boxes are still lacking at the important points in the Somme Valley and on the Beauvais ridge. Belgian wireless is good one hears, but it only operates at Brussels and can give no information about coastal weather. Dutch wireless is excellent at Rotterdam and Amsterdam, but there ought to be a signal-box at Flushing. Anyhow the net result is that whichever way a pilot is going he cannot afford to lose sight of the water when crossing the Channel for fear of missing

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The Fairey Aviation Company,
LIMITED.

Head Office - - - - - HAYES, MIDDLESEX.
Siège Social—Oficina Principal.

Works - - - - - - HAYES, MIDDLESEX, and HAMBLE, near SOUTHAMPTON.

Contractors to British Admiralty, War Office and Air Ministry.

Sole Patentees of the Fairey Patent Variable Camber Gear for Aeroplanes Seaplanes and Flying Boats.

Designers and Manufacturers of all classes of Seaplanes, Flying Boats, Aeroplanes, Amphibian Aircraft, Aircraft specially fitted for Survey and Photographic purposes, Floating Hangars, and complete equipment for same.

Designers by special request of the largest Flying Boat built for the British Government.

Contractors for the laying out and complete equipment of Passenger, Mail and Express Goods Services by Aircraft.

Designers and Manufacturers of the Fairey Type III. Series of Machines as supplied in quantity to the British Government during the War and since its termination. In this series of Machines the Fuselage, Centre Plane, Tail Unit, etc., are standard and are adapted to take different types of wings, chassis and engines of other Machines of the series to suit the particular purpose for which the machine is required. All machines of this type have folding wings and are fitted with our patent Variable Camber Gear giving high performance and lifting power combined with low landing speed.

Fournisseurs des Ministères de la Guerre, de la Marina et de l'Air.

Seuls détenteurs du brevet Fairey pour dispositif de cambrure variable pour aéroplanes, hydravions et bateaux volants.

Constructeurs de toutes espèces d'hydravions, bateaux volants, aéroplanes, appareils amphibies avions spécialement aménagés pour levèes topographiques et photographiques, hangars flottants et équipement complet pour ces derniers.

Constructeurs, sur commande spéciale du Gouvernement Britannique du plus grand bateau volant construit jusqu'à ce jour.

Etude et entreprise de la fourniture du matériel complet pour services de transport aérien rapide de passagers, postes et marchandises. Constructeurs des Fairey Type III. Série de machines journies en grandes quantités au Gouvernement Britannique pendant la guerre et depuis la cessation des hostilitiés. Dans cette série de machines, le fuselage, le plan central et la queue, etc., sont de type normal, et sont construits de manière à pouvoir recevoir des ailes de types differents, ainsi que des châssis et moteurs d'autres machines de la série, de manière à être appropriés à l'usage auquel la machine est destinée dans chaque cas particuleur. Toutes les machines de cette série ont des ailes démontables et repliables et sont munies de notre dispositif breveté de cambrure variable, qui permet les plus grandes performances et qui combine une grande puissance de soulèvement avec une faible vitesse d'atterrissage.

Proveedores del Almirantazgo, Departamento de Guerra y Ministerio de Aviación Bri anicos.

Unicos poseedores de la patente Fairey de dispositivos de combeo variable para aeroplanos, hidroaviones y barcos aéreos.

Diseñadores y constructores de hidroaviones, barcos, aéreos, aeroplanos, aparatos anfibios, de todas clases, tambien de aparatos especialmente adecuados para el levantamiento de cartas topográficas y fotográfias, hangares flotantes y completo equipo para estos mismos.

Diseñadores, por orden especial del Gobierno Británico del barco aéreo más grande que se ha construido para este gobierno.

Proveedores de todo lo necesario para servicios de transporte aéreo de pasajeros, correos y mercancías.

Diseñadores y constructores del tipo Fairey III. Serie de aparatos suministrados en grandes cantidades al Gobierno Británico, durante la guerra y después de su terminación. En esta serie de paratos, el fuselage, el plano central y la unidad de la cola, son de tipo normal y fabricados para adaptarse á diferentes tipos de alas, chassis y motores de otros aparatos de series que sean adecuadas para los fines particulares a que se destina el aparato en cada caso. Todas les máquinas de este tipo, tienen alas plegadizas y están provistas del dispositivo patentado de combeo variable Fairey que da una alta capacidad y potencia de ascensión combinada con una velocidad baja de aterrizaje.

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the coast on the other side. Some pilots do go up over the clouds and navigate by compass, but it is a risky thing to do and it would never be necessary if a very few thousands of pounds per annum were spent on observation posts and directional wireless stations. No railway manager would tolerate for a week the futile signal system under which the air lines operate.

Chances versus Opportunities.

Anyhow the net result was that our excellent Air Minister and his lady went across the Channel at less than 1,000 feet hanging on a single engine. Admittedly there is no better or more reliable engine on which to hang, but one's personal opinion is, to put it colloquially, that such a performance simply is not good enough. It is taking too much of a chance. And success in a commercial undertaking as in the life of an individual depends not on taking chances but on taking opportunities.

It is all very fine to take a chance when the results of loss are not too serious. A pilot killed when taking a chance on a racing machine or through crashing into a mountain in a cloud when on a newspaper stunt is all in the way of business. But to take the chance of drowning a perfectly good Air Minister is too much, even at such short odds as would be offered against a De Havilland-Napier combination piloted by Mr. Hinchliffe. So far as the Director of Civil Aviation was concerned it would have been his own funeral, so to speak. And as regards oneself one always remembers the dictum of a Service friend who remarked that one of the best jobs ever done in aviation was when an Italian aeroplane during the War took twelve journalists in one bunch to a height of 10,000 feet and there considerately fell to pieces.

One of His Majesty's Principal Secretaries of State (which is the official title of the Air Minister) is not a person to be lightly—or heavily—deposited in an aeroplane crash. Such an affair would be too much to the taste of the yellow press of the World and would do more harm than a hundred common or agricultural crashes by ordinary passengers in the open country. It did not happen, thanks to the perfection of Daimler Airway organisation. But one still holds that it was taking too big a chance.

The fact that the evils of taking a chance do not occur is no excuse for taking the chance. In this instance one feels that the Air Minister should have waited the opportunity of making his tour on a multiple-engined aeroplane designed to alight on water and having the slow-flying slow-landing qualities of a Fairey "Flycatcher," a machine which although designed as a fighting machine does in fact possess the chief desiderata of the perfect passenger-carrying aeroplane.

Topographical Troubles.

However we got across the Channel without incident and proceeded up the Belgian coast which as our young friend G. D. noted does not seem to be much used by the Belgians, chiefly because, like that landscape which caused the Walrus and the Carpenter to weep like anything, it consists of such quantities of sand. In case of engine failure one hopes to land on the beach, a feat which at 70 miles an hour in a cross-wind takes some doing. Inland are sand-dunes and dykes on which nothing could land except with a vertical drop such as at present can only be done by Avros with oleo-pneumatic undercarriages or by the aforesaid "Flycatcher."

Along this part of the route the beach was chiefly occupied by blinding rainstorms and the clouds were down at 800 feet—most of the way. Sand-dunes and dykes with glimpses of heavily-groined beach and intimate views of post-bellum red roofs are entertaining at such a height provided that one forgets the landing problem for the time being.

Mr. Hinchliffe made rather more than the best of the circumstances. He is a perfect artist at scraping along with his upper plane in a cloud and his lower plane just out of it. And he dodges rain-storms as an R.A.F. Rugger half dodges Navy tackling. But he had to work like a nigger to get through. Also nothing could be prettier than the way he hits a cloud when he cannot dodge it. The way he slides under and into it with his engine throttled down and then opens up is just like the way a good driver on a speed-car takes a humpy bridge on a fast road.

Dutch Dykeland.

Over Holland itself the landing problem becomes more pressing. A country consisting so far as this route is concerned entirely of regulation tennis courts surrounded by water-filled ditches is no place on which to put a machine which hits the ground at 70 m.p.h. even though it may pull up in less than 100 yards after hitting. As we passed over the Zeeland Islands it occurred to one that though the D.H.34 is certainly one of the two best passenger-carrying aeroplanes in the World it seems to have been specially designed not to land in Holland.

Doubtless if the Air Ministry ordered a D.H. for this particular job Captain de Havilland and Mr. Walker would produce the very thing necessary. And if the Air Ministry wants to do good to Civil Aviation that is what they ought to order. At this stage it is mere folly to order standardised aeroplanes.

The Daimler pilots have emergency orders not to land on these water-logged tennis courts but to come down on the beach round the islands. This has been done with success at least once but on another occasion a machine landed in soft sand and stood on its nose. And one would like to bet that some of the stuff that looks like sand is only mud. And being drowned in mud is much stickier than being drowned at sea. Still Sir Samuel Hoare has now seen all this for himself and one hopes for proper results in due course.

We landed in a shade less than two hours at Rotterdam, a perfect aerodrome except for the surrounding docks and dykes and ditches. It has a wonderful surface which is rather larger than all Croydon. Mr. Hinchliffe skilfully defeated a final rainstorm by circling round it as it swept across the aerodrome and landing on its tail, the D.H. hitting the ground and staying there with all the immutable decision of a brick. One doubts whether even the Director of Civil Aviation could make a D.H.34 bounce.

The Reception and Lack of It.

A mass formation of K.L.M. sturm-truppen promptly fell upon the machine and disembowelled the baggage while the K.L.M. Hofd Kommandantur or Grand Quartier Général (one is ignorant of the Nederlandsche term for it) advanced in open order with open arms to receive our official passengers. The home-defence party was headed by the Under-Secretary for Air in the Netherlands Government, who is an ex-Naval officer and an under-official of the Waterstaat—which after seeing Holland from above seems to be the right department to handle air affairs. One only wonders that they are not run by the Submarine Service of the Dutch Navy.

Be that as it may the Dutch official welcome was of the heartiest as hearty as that which our more humble selves received from our capacious friend Fritz Koolhoven who emerged onto the aerodrome as we landed and blotted out most of the view of the aerodrome buildings. His subsequent hospitality during a delightful four days in Holland is of no public interest though one wishes here to record one's appreciation of it. Friend Plesman of the K.L.M. had a few words to say amicably on the slight bicker between our G. D. and Captain Leverton, and one gathers that the whole argument is a purely personal affair in which neither the K.L.M. nor the Daimler Airway nor the two amusing newspaper controversialists are in any way concerned.

The most curious feature of the official visit was the complete absence of any British representative from our Embassy, Legation, Consulate or whatnot. One would have expected some person of some consequence to have been there to receive one of His Majesty's Principal Secretaries of State. Perhaps the personnel of these august establishments do not realise that the Daimler Airway runs with greater regularity than does a steamboat service. It will be well for them to learn.

Later in the day Sir Samuel Hoare and Sir Sefton Brancker were encountered wandering at large in The Hague by Colonel Wallaardt-Sacré lately commanding the Netherlands Army Flying Corps and now of the Nationale Vliegtuig Industrie. He is one of the World's great humorists besides being a great diplomat and possessed of a Pentecostal gift of tongues. The Colonel went quietly up to our officials and said "Want a guide sir?" in the best professional manner. And one gathers that he was gratefully received. But one would have expected His Majesty's representatives in Holland to have shown a little active interest in so important a visitor as the Air Minister.

The Reverse of the Picture.

After four perfect days in Holland, bar the weather, we returned by way of the Hook and Harwich, there being no air service on the Bank Holiday. It took as long to get from The Hague to the Hook as it had taken from Croydon to Rotterdam. There were passport and baggage delays at the Hook and at Harwich. The boat hung about before starting longer than a dozen aeroplanes would do at Croydon. The train sat on the quay at Parkstone for the better part of an hour but being allowed plenty of leisure got to Liverpool Street at the right time. And then it took an hour to drive through jammed city traffic to our humble domicile, which can be reached from Croydon or Cricklewood in just half the time.

The fare from the Hook to Liverpool Street is 55s. 6d. Add to that rail fare to the Hook from Amsterdam or Rotterdam, tips and meals on the boat and train, taxi fares, tips to porters and others who do little for much money and there is precious little change out of the £4 which it costs to go by car from Northumberland Avenue to Croydon, thence by air to Rotterdam or Amsterdam, and thence by car to one's hotel in the city itself. Taking it all round the complete comfort plus some slight extra risk of a two or three hour trip by air is worth a good deal more than the intense discomfort and boredom of the probable six hours of seasickness of the rail and boat journey. It is a pity that more people do not know it.—C. G. G.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The Wibault high-altitude fighter, described and illustrated below, is the latest product of one of the most progressive aeronautical engineers in France. It is also of a type which the French are producing in numbers, but of which we have no samples in this country, in that it is fitted with a supercharger as part of the normal equipment. It is believed that some such machines are being built in England.

The importance of the supercharger can readily be understood if the performance of the Wibault fighter at altitude be considered. A ceiling of 34,000 ft. and a speed of 177 m.p.h. at 16,500 ft. means that this machine cannot possibly be caught by any existing British Service type.

The performance of the Bristol "Cherub" two-cylinder engine in passing the Standard Air Ministry Type Test, including a 50 hours' non-stop run, is recorded in this issue. This test shows that it is possible to make a light low-powered engine up to the regular standard of aero-engine reliability, and incidentally places the "Cherub" in the position of being the only really low-powered engine which can be used in a machine if a complete Certificate of Airworthiness be desired.

THE WIBAULT MONOPLANE FIGHTER.

This latest production of M. Michel Wibault is one of the supercharged high-altitude fighters which the French Air Service is now developing. The requirements of the "*Section Technique*" in regard to this class of aircraft are somewhat stringent.

High aerodynamic efficiency, great manœuvrability, ease of flying, high speed, high ceiling, long range, excellent vision, accessibility of machine guns, simplicity and cheapness of construction and repair, and a very high factor of safety are among the requirements.

The Wibault fighter is a thick-winged parasol monoplane with rigid struts bracing the wings at about half their span. The determining factor in the choice of this type as against the pure cantilever type is that of strength. The specified wing load factor to be checked by an actual sand test was 19, and under these circumstances the cantilever wing would have had to be very thick on the centre line—which would interfere with the pilot's view—and considerably heavier than the braced wing. Troubles which have occurred with high-speed cantilever machines suggest that the difficulties of securing a wing sufficiently rigid against torsional loads is very serious in machines which are expected to manœuvre at high speeds, and it is believed that the added drag of the bracing struts is not enough to counterbalance the structural difficulties of the cantilever type.

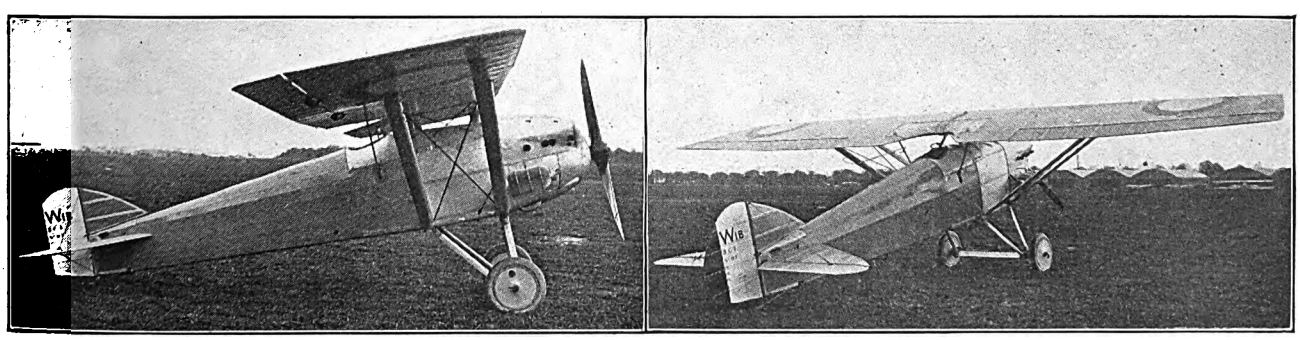
Except for the covering the machine is all metal. A few specially heavily-loaded fittings are of high tensile steel but the main structure is of duralumin. The wing spars are of box section, tapering towards the tips, and the ribs of duralumin tube all of the same diameter and gauge.

The control surfaces are of normal type and entirely unbalanced. The ailerons are of narrow chord and considerable span and are operated from the control-lever by rigid connections. An adjustable tail-plane is fitted.

The machine in trials has proved to possess an excellent performance, a very flat glide, and to behave in a thoroughly satisfactory manner.

SPECIFICATION.

Machine Types No., etc.	Wibault 3C.1
Span	11.6 m. (38 ft. 0 in.)
Length	8.10 m. (26 ft. 7 in.)
Height	3.05 m. (10 ft. 0 in.)
Wing area	26.5 sq. m. (274 sq. ft.)
Weight empty	970 kg. (2,138 lbs.)
Weight of fuel	230 kg. (504 lbs.)
Pilot and equipment	220 kg. (484 lbs.)
Weight loaded	1,420 kg. (3,026 lbs.)
Engine	Hispano-Suiza 300 h.p. (Rateau Supercharger)
Wing loading	33.6 kg./sq. m. (11.2 lbs./sq. ft.
Power loading	4.73 kg./h.p. (10.6 lbs./h.p.)
Speed at 2,000 m. (6,500 ft.)	245 km.h. (155 m.p.h.)
Speed at 5,000 m. (16,400 ft.)	280 km.h. (177 m.p.h.)
Ceiling	10,500 m. (34,400 ft.)
Landing speed	80 km.h. (50 m.p.h.)
Range at 5,000 m.	850 km. (535 miles)



The Wibault Monoplane high altitude Fighter (300 h.p. Hispano-Suiza and Rateau Supercharger).

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THE BRISTOL "CHERUB'S" TYPE TEST.

The little two-cylinder opposed engine known as the "Cherub" recently produced by the Bristol Co. for low-powered aircraft has now been submitted to an official type test under the conditions laid down by the Air Ministry and under A.I.D. supervision.

The tests were made on a Froude Dynamometer precisely as with larger aero engines.

The 50 hours' endurance test at 90% of full power was made in one non-stop run. The average power developed during this run was: 15.4 h.p. at 2,200 r.p.m. The fuel consumption averaged 9.7 pints per hour and the oil consumption .63 pints per hour. Throughout the test the engine was cooled by a fan driven direct from the crankshaft.

After taking a power-curve the engine was run for 1 hour at full throttle developing 18.5 h.p. at 2,200 r.p.m.

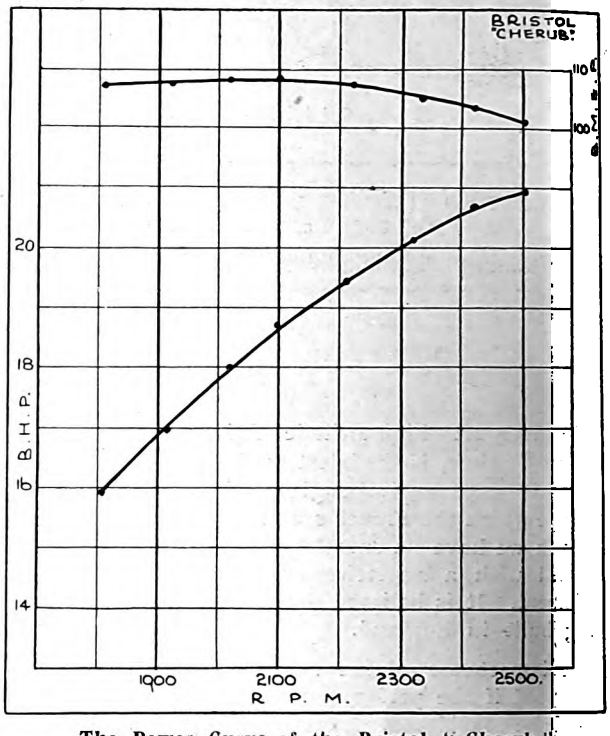
On stripping and measuring up after these tests the engine was found to be in perfectly satisfactory condition.

The Bristol "Cherub" with its 1,086 c.c. of cylinder capacity is unfortunately outside the maximum rating permitted for the competitions to be held during the coming autumn.

This however may not prove to be so regrettable as it may at first appear. The competitions will tend to develop a satisfactory light aeroplane, using more or less makeshift engines—but once the competitions have shown the capacity of such machines there can be little doubt that there will be a demand for a robust and reliable small engine for practical use in such machines.

The original intention of the Bristol Company was to build the engine in two types—geared and ungeared—but it has since been decided that any extra airscrew efficiency which can be obtained as a result of gearing will not offset the extra expense and complication of the gear-drive. Consequently the ungeared model has been adopted as a standard, and a batch of this type is now in production.

The weight of this model is 75 lbs.



The Power Curve of the Bristol "Cherub."

ENGINES FOR LIGHT AEROPLANES.

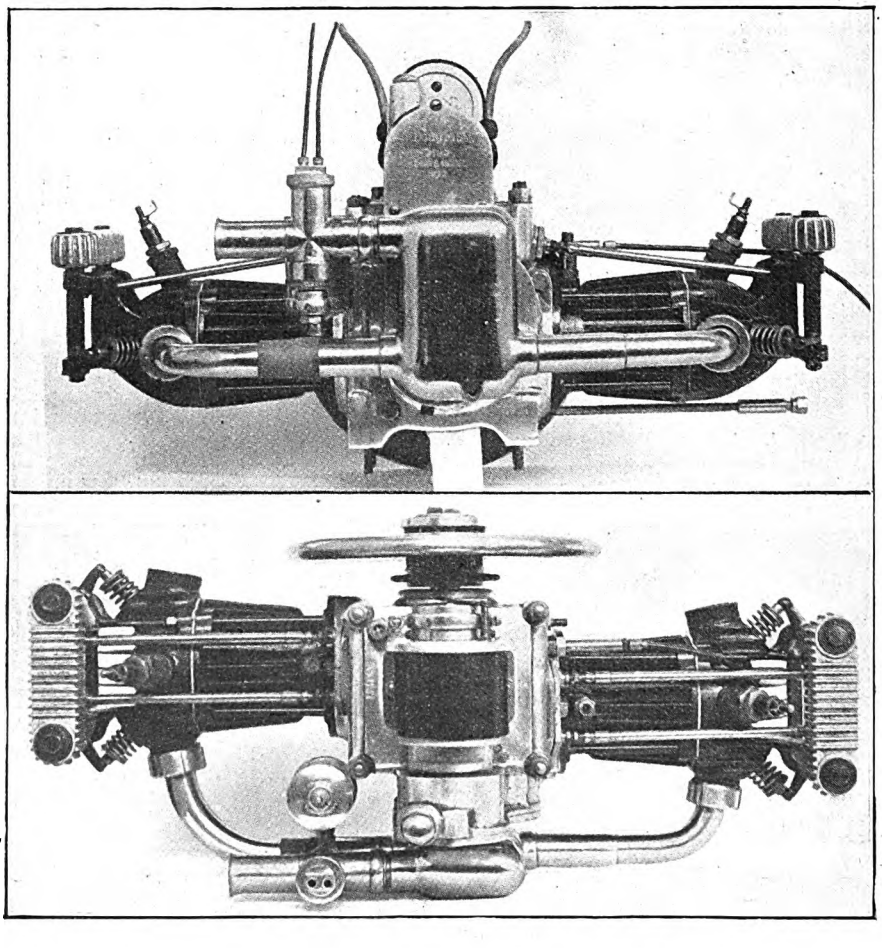
THE 3½ H.P. DOUGLAS.

The Douglas motor-cycle engine has probably a larger period of steady development behind it than any other existing twin-cylinder engine of the motor-cycle type. It is certainly the pioneer of the "flat twin" type, and its record for reliability on the road is an amazingly good one.

Douglas Motors Ltd. build three sizes of motor-cycle engine, the 349 c.c. (2¾ h.p.) type which is probably the most used two-cylinder motor-cycle engine in the world, the 500 c.c. (3½ h.p.) model, and a larger engine of 750 c.c.

Of these three models the Douglas firm themselves recommend the 500 c.c. type for aero-work, as it has been very carefully developed for racing and similarly arduous work, and has shown its capacity to stand up to long periods of running at high speeds.

As may be seen in the attached photographs the engine is



AN ENGINE FOR LIGHT AEROPLANES.

Elevation and plan of the 500 c.c. (3½ h.p.) Douglas Engine. The engine is shown fitted with the standard motor-cycle carburetter and controls, which would be modified for aeroplane work, and with the standard fly-wheel and chain sprocket.

The engine is obviously a neat and compact unit and could be very neatly encowled leaving only the cylinder-heads exposed.

The arrangement of inlet and exhaust ports is excellent for aero purposes—the exhaust ports face the airscrew end and the inlet pipes at the opposite side of the engine could easily be modified to give a low carburetter position.

The nearness of the exhaust port on the left-hand cylinder to the plane of the fly-wheel may present a slight difficulty if the engine is used for a direct-driven airscrew. The boss for the airscrew will have to overhang the crankshaft end appreciably to give clearance at this point.

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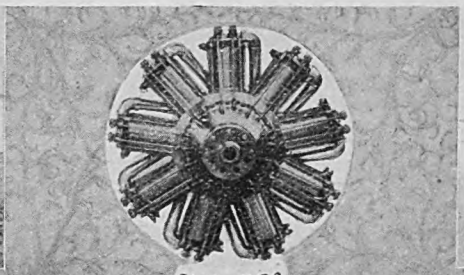
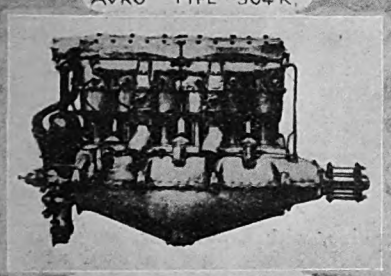
BRITISH ADC LIMITED AIRCRAFT

A SELECTION FROM OUR STOCK.

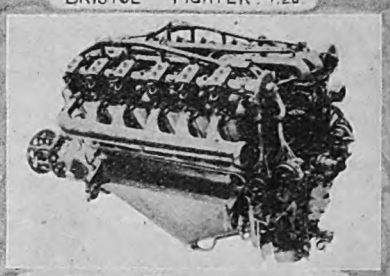
AVRO TYPE 504 K.


200 h.p. B.R.2

BRISTOL FIGHTER. F.2B.


230 h.p. SIDDELEY "PUMA".

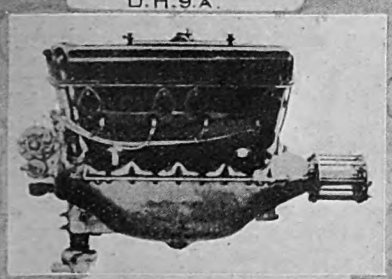
D. H. 9.


360 h.p. ROLLS-ROYCE "EAGLE" VIII

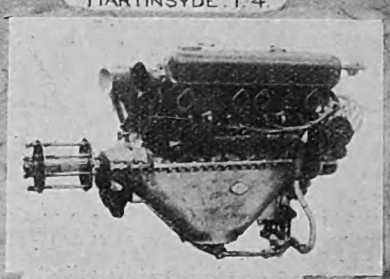
D.H.9.A.

100 h.p. MONOSOUPAPE.

MARTINSYDE. F.4.


300 h.p. HISPANO-SUIZA.

S.E.5.A.


210 h.p. WOLSELEY "VIPER".

F.3. FLYING BOAT.

110 h.p. LE RHONE.

PARNALL PANTHER.

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AIRCRAFT DISPOSAL COMPANY LTD.

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of very clean outline and compactly arranged. The crankcase is designed to embrace the bottom tube of the motor-cycle frame, and therefore can at once be attached to a cross-bearer of steel tube of the correct diameter carried in the fuselage structure. An outside fly-wheel is fitted as a standard outside of the chain sprocket normally used for driving, and if the engine is to be used for a chain-driven airscrew, this arrangement probably need not be altered.

For a direct drive airscrew the standard fly-wheel and sprocket would be removed, and it will probably then be found possible to arrange a thrust race in a separate housing outside the crankcase. With a direct drive airscrew a somewhat extended airscrew boss will be necessary to carry the screw clear of one of the exhaust ports—as owing to the stagger of the cylinders one of these ports is nearly in the plane of the standard fly-wheel.

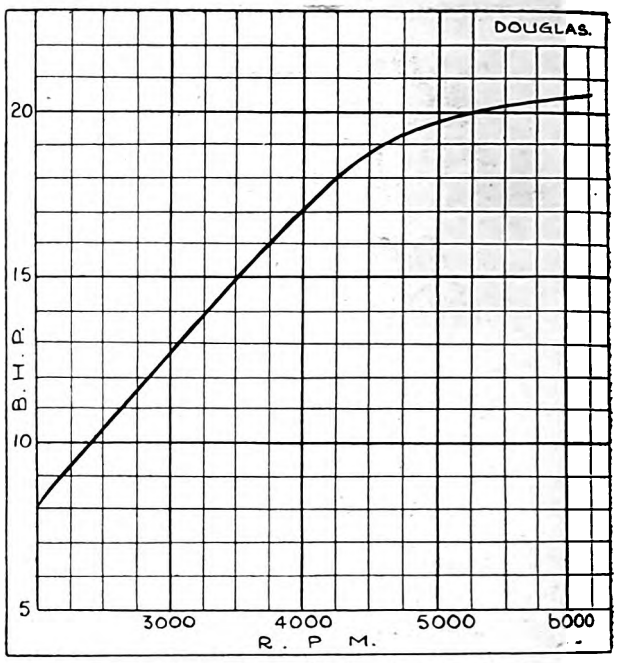
This engine is fitted with cooling fins parallel to the bore of the cylinder instead of the usual circumferential ribs. For a motor-cycle engine designed to travel with its crankshaft at right angles to its direction of motion this is rational—but it is probably not quite so effective for cooling purposes if the engine is to travel broadside on.

There is no doubt that on an aeroplane the engine will be adequately cooled, but there is a slight possibility that this fin arrangement may lead to an exaggerated difference of temperature between the front and the back of the cylinders, and lead to trouble with cylinder distortion.

The carburetter and induction-pipe arrangements shown in the photographs is that standard on the Douglas motor-cycle. For aeroplane work it will probably be advisable to fit a carburetter below the centre of the horizontal pipes to the inlet valve—as this will simplify the provision of a gravity petrol feed.

The power curve of this engine is reproduced. It will be seen that the maximum power developed is over 20 B.H.P. at r.p.m. in the neighbourhood of 6,000.

The makers state that the engine may be run up to 5,000 r.p.m. with confidence but recommend 4,000 as more likely to conduce to thorough reliability. As the B.H.P. available at this speed is still 17 one is certainly inclined to agree with them. It is worth noting that at 2,500 r.p.m. the h.p. is slightly over 10, and that the engine could quite well be used at this speed and power for a directly-driven airscrew as the power developed is adequate for a low speed lightly-loaded machine cruising at 40-45 m.p.h.



Power Curve of the 500 c.c. Douglas Engine.

The weight of this engine, with carburetter, magneto and controls, but without fly-wheel is 58 lbs. If used at 2,500 r.p.m. on a direct drive, the fly-wheel need not be used, and the weight per h.p. (10 h.p.) is 5.8 lbs. If the engine is to be "revved up" to higher power a chain-drive and fly-wheel will be necessary but probably a better overall weight/power ratio can be obtained.

The fuel consumption is given by the makers as .65 pts. per B.H.P. hour. This is presumably a full throttle figure for maximum power, and could doubtless be improved at some sacrifice in maximum output.

C.A.M.S. FLYING-BOATS.

The *Chantiers Aero Maritimes de la Seine* have during the past twelve months designed, built and tested four distinct types of flying-boats. Taking into consideration the neglect of French maritime aviation, and the apparent disability of any other French firm to produce modern flying-boats the achievement of the C.A.M.S. in producing these four boats each of which is designed for a different purpose is very praiseworthy.

The C.A.M.S. 30E. is a two-seater school flying-boat. This boat was exhibited at the 1922 Paris Salon.

It has since been tested at Pecq before representatives of the French Navy, the *Section Technique* and various foreign Governments; and it impressed everyone by its perfect control and stability.

A top speed of 160 km. (100 miles) p.h., a minimum speed of 70 km. (43 miles) p.h. and a climb to 2,000 metres with a full load of 295 kilogs. in 17 mins. was achieved. This boat, which is fitted with an 140 h.p. Hispano-Suiza engine, will also be produced as a four-seater general purposes flying-boat.

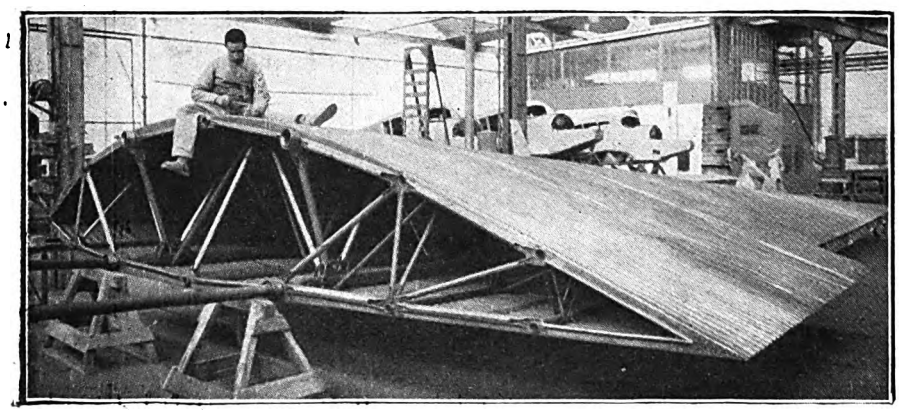
The C.A.M.S. 31 is a single-seater fighter flying-boat equipped with a 300 h.p. Hispano-Suiza engine and two fixed Vickers guns in the nose of the hull. Before the *Section Technique* at Pecq this boat made a top speed of 200 km. (125 m.) p.h. and minimum speed of 88 km. (55 m.) p.h. and climbed to 1,000 m. in 3 mins., 3,000 m. in 14 mins. and 5,000 m. in 33 mins.

The C.A.M.S. 33-T is a twin-engined commercial flying-boat fitted with two 260 h.p. Marine type Hispano-Suiza engines in tandem. On its preliminary tests it demonstrated its ability to get off and fly with a full load of 4,000 kilos. With a full load of 4,000 kgs. the machine flies with one engine cut out and with a load of 800 kgs. it not only flies well with one engine, but actually climbs. A top speed of 170 km. (106 m.) p.h. was made during these tests.

The C.A.M.S. 36 is a small racing flying-boat fitted with a 300 h.p. Hispano-Suiza engine and tractor airscrew. It was built for the 1922 Coupe Schneider but was not completed in time.

The hull is similar to the type 31 except that the pilot is situated in rear of the bottom plane. It has been tested at the St. Raphael seaplane base by Lieut. de Vaisseau Urel and showed an excellent manœuvrability. A top speed of 250 km. (156 m.) p.h. was made and the machine lost no height with the engine throttled back to 1,100 r.p.m.

These four machines reflect great credit on M. D. Lawrence Santoni, the founder of the firm, and on M. Conflenti, the designer.



A CURTAILED EXPERIMENT.—This photograph shows one section of the wing of a large twin-engined experimental Junkers monoplane which was partly constructed during 1922 at the Junkers Werke, Dessau.

The completion of this machine was prevented under the rules laid down by the Council of Ambassadors for the restriction of German aircraft construction.

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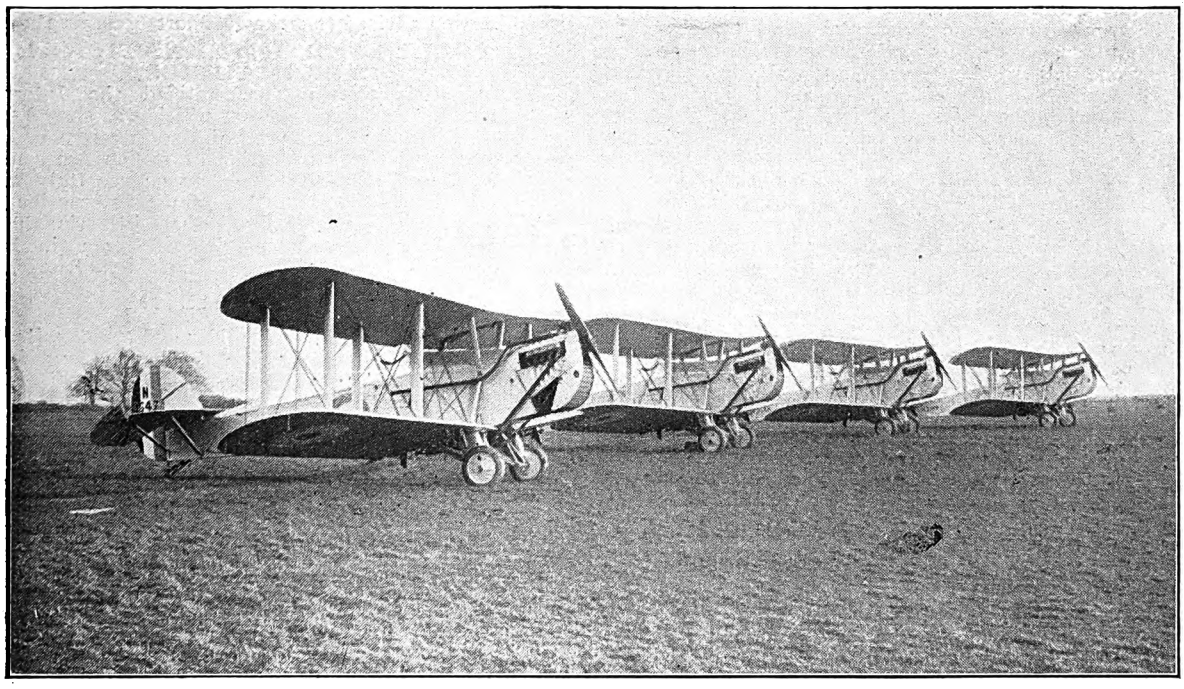

A BATCH OF BLACKBURN TORPEDOPLANES, FITTED WITH NAPIER "LION" ENGINES, PRIOR TO DESPATCH TO BRITISH GOVERNMENT.

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THE "JOY-STICK" CLAIM.

After a very prolonged appeal before the Paris Court of Justice, M. Robert Esnault-Pelterie has succeeded in extracting very heavy damages from the French Government and various constructing firms for the infringement of his patent on the "joy-stick" method of control. M. R. Esnault-Pelterie was one of the earliest of French aeroplane constructors, his initial R.E.P. being followed by a series of monoplanes most of which flew well and achieved some success at the various French aviation meetings of a decade, and earlier, ago.

During the war a few R.E.P. monoplanes were used during the first few months, but for practically the whole period of hostilities his factories were engaged in building by license other makes of aircraft. Since the war he has entirely suspended aircraft construction, the above litigation involving all his time and incidentally offering considerably more reward than the mere building of aircraft, even in France.

As the result of the award the Caudron firm and the State jointly are called upon to pay 2,500,000 francs and the State alone 312,000 francs as compensation in respect of Caudron aircraft built during the war. The Breguet Company and the State jointly are to pay 3,000,000 francs, with an additional 375,000 francs to be paid by the State. The Farman Company and the State jointly are to pay 225,000 francs and the State alone 28,125 francs. In the case of the Morane-Saulnier Company, the State alone are to pay 1,000,000 francs.

THE FREEDOM OF THE STRAITS.

The following is an extract from an article on the R.A.F. in Turkey in "U.S. Air Service" of April, 1923, by Major Albert L. Sneed, U.S. Assistant Military Attaché for Aviation in Turkey :—

"The Freedom of the Straits! How pretty it sounds! How smoothly it slides off the tongue! And what does it mean—'Freedom of the Straits?' Freedom of passage for ships of the sea, you say. No forts, no bristling guns, no hidden gun-pits to menace or disturb, just an open path over which may journey the commerce of the World. And yet not once has any mention been made of the 'Freedom of the Air.' The Straits may be made free by treaty but they will remain so until someone wants to close them from the air.

"To-day one nation holds the military and naval situation in this vicinity in the palm of her hand by her air fleets. When Great Britain wanted to establish an air station on the Gallipoli Peninsula, her land 'planes were sent off the deck of her latest aircraft-carrier. Those planes landed on a hill-top. That hilltop is now an airdrome. If it were necessary to abandon that airdrome, those same 'planes could return and land upon the same deck which sent them off. If one thinks that another Gallipoli Campaign such as that witnessed in 1915 were possible, it would be well to note the above manœuvre and mark it. See where it fits in the march of Aviation towards its destiny."

ALL'S WELL THAT ENDS WELL.

The horrible word "motor-glider" seems to have been the work of the *Daily Mail* which paper, owing to the success of its glider prize, seems to expect some reflected glory from this year's Sutherland Competition, seeing that it has offered a supplementary prize, by insistently bringing in the word "glider" when alluding to avionettes.

The absurdity of this even penetrated to the *Mail* after M. Barbot's cross-Channel flight and by way of a climb-down it opened a sort of guessing competition among its readers to choose a new name. The stupid names suggested were quite what might have been expected though it was easy to see that many were merely leg-pulls which the *Mail* swallowed (to use a somewhat mixed metaphor).

The best suggestion one has heard so far is that the little machines should be called "Alanjays" because they fly very well indeed but make a tremendous amount of noise for their size.—G. D.

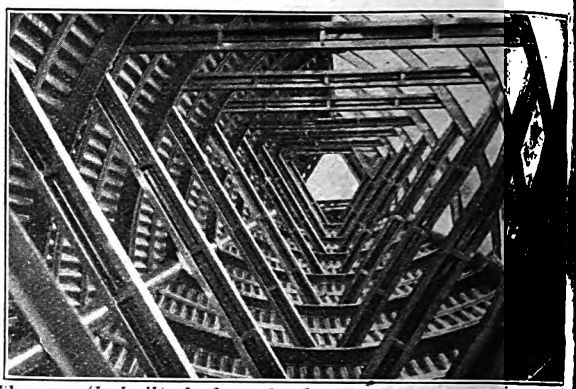
[An equally good suggestion which another one has heard is that many of them might be termed "Geedees." These of course would scarcely fly at all and their clamour would be overwhelming.—W. H. S.]

AIR OVER SEAS.

Mr. H. A. Jones, M.C., Croix de Guerre, who was so closely associated with the late Sir Walter Raleigh in compiling the official History of the War in the Air has now left the Air Historical Branch and has joined the Editorial Section of the Department of Overseas Trade. Mr. Jones' intimate knowledge of aircraft should be of considerable use in the Department which he has just joined and one hopes that the Aircraft Industry will avail itself of the services of that Department which ever since its formation has been remarkable as being the most prompt, efficient, business-like and courteous department under the Government.

SATISFACTIONS.

BRITISH ANZANI ENGINE CO. LTD.—Satisfaction to the extent of £2,000 on May 7, 1923, of debentures dated Sept. 10, 1920, securing £10,000.



The partly-built body of the twin-engined experimental Junkers monoplane, one of whose wings is illustrated on the previous page.

A SEAPLANE BARGAIN.

As may be seen in the advertising columns of this issue, Short Bros. of Rochester are offering for sale an example of the Short sporting type seaplane, generally known as the "Shrimp."

This machine is of a type which is admirably suited for "joy-ride" or similar work. It is a normal tractor type twin-float seaplane carrying a pilot and three passengers. There are two seats in tandem, fitted with dual control, and behind two side-by-side seats.

The engine is a 240 h.p. Siddeley "Puma," well known for its reliability. With this engine the machine has a top speed of 90 m.p.h. lands very slowly and climbs to 6,000 ft. in 25 minutes fully loaded.

It is fitted with the Short patent folding wings allowing it to be stored in a very small space. The machine is excellently adapted for sporting, joy-riding, or school work, and any person or firm who needs a machine of this type would be well advised to write to Short Bros. on the subject.

ITALY AND INTERNATIONAL AERONAUTICS.

The Italian Government has ratified the International Convention for Aerial Navigation which was signed in Paris on Oct. 13, 1919. This is one of the first important steps undertaken since the reformation of Italian Aeronautics by Signor B. Mussolini, G.C.B. In consequence Italy will take part in the forthcoming meeting of the International Commission for Aerial Navigation to be held in Paris, the Italian representatives being Commendatore Mercanti, Director-General of Civil Aeronautics, and Lieut.-Col. Riccio, Italian Air Attaché in Paris.

FRENCH GLIDING.

For the forthcoming French glider and "*avionette*" meeting to be held at Vauville near Cherbourg on Aug. 6-27, nine entries have been received up to May 17. These include four gliders and five *avionettes*.

Of the more interesting machines may be mentioned the Bréguet "Colibri," the S.A.B.C.A. monoplane and the Poncelet monoplane, all of which are equipped with 10 h.p. motors.

The Bréguet "Colibri" is a monoplane of novel but unknown construction fitted with an unknown make of 10 h.p. engine. Its dimensions are :—Span, 10.25 m.; length, 6.2 m.; surface, 15 m²., and weight, light, 110 kgs.

The S.A.B.C.A. is a Belgian entry, constructed by the Soc. Anon. Belge de Constructions Aéronautiques and designed by M. Jullien. It is a thick-wing monoplane of the following dimensions :—Span, 13.4 m.; length, 5 m.; surface, 20 m²., and weight, light, 170 kgs. The pilot of the S.A.B.C.A. monoplane is to be Lieut. V. Simonet.

The Poncelet monoplane has already been flown as a glider in Belgium and for its participation in the Vauville meeting it is to be fitted with an 8 h.p. Anzani engine. It is a cantilever monoplane and will be flown with either rigid or flexible wings. Its dimensions are :—Span, 11.2 m.; length, 6.6 m.; surface, 20 m².; weight, 110 kgs. without engine and 155 kgs. with engine. This machine has been entered, and will be flown, by Lieut. V. Simonet.

CONCERNING A.B.C. ENGINES.

Jarvis & Sons Ltd., of Victoria Crescent, Wimbledon, announce that they have in stock a large number of A.B.C. motor-cycle engines which they can supply from stock, fitted with "Celerity" high-duty valves and "Lamplugh" automatic oil-pumps. The price is £32 10s. each. For an extra £5 they will supply the engine specially tuned to develop 9 B.H.P. at 2,500 r.p.m. instead of the 4½ B.H.P. of the normal engine at this speed.

It is of interest to learn that the engine successfully fitted to the "Wren" was supplied by this firm and that therefore the firm has already some experience of engines for this class of work.

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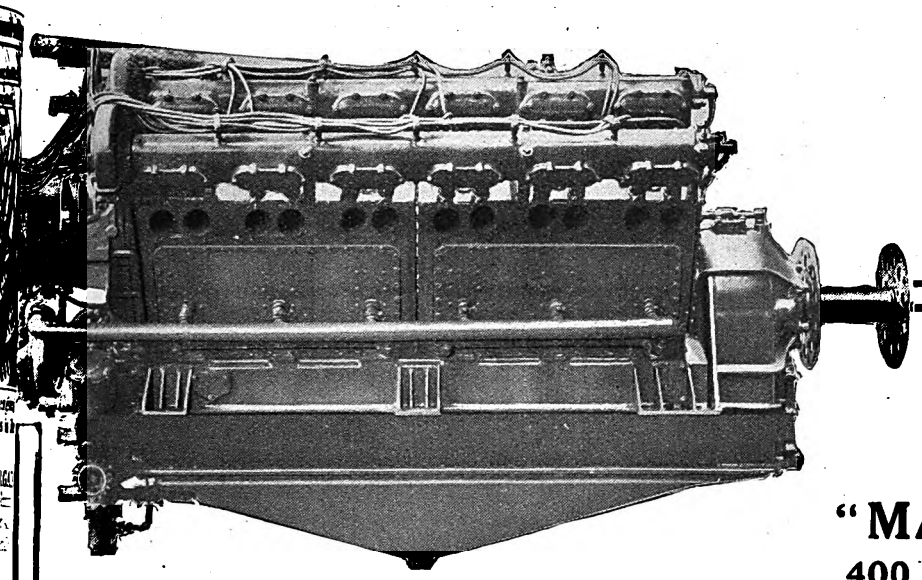

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400 h.p. 12 cylinder
AERO ENGINE
As supplied to the French Government.

The following list of Engines, designed and manufactured by the Company, is unequalled in its range. All these engines are of proved efficiency and extreme reliability, and can be recommended with confidence for aviation purposes of all kinds.

"DYAK"	100 h.p. 6-cylinder	"SIKH"	1000 h.p. 12-cylinder
"ARAB 2" (Direct Drive)	200 h.p. 8-cylinder	"MAORI"	275 h.p. 12-cylinder
"MANITOU" ..	300 h.p. 12-cylinder	"COSSACK" ..	350 h.p. 12-cylinder
"MATABELE" ..	400 h.p. 12-cylinder	"SIKH"	500 h.p. 6-cylinder

We shall be pleased to supply specifications, installation diagrams, prices, and any other information upon request.

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MANCHESTER - - *Showrooms* - - - - - - - - 106, Deansgate.
" - - *Northern Service & Repair Works*, 288/294, Eccles New Rd., Weaste.

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R.A.F. INTELLIGENCE

Appointments.

From *The London Gazette*, May 22.

R.A.F. GENERAL DUTIES BRANCH.—The following are granted perm. commns. in ranks stated, with effect from dates indicated. The notifications in *Gazettes* of those dates, apptg. these offirs. to short service commns., are cancelled: F/O. D. D'A. A. Greig, D.F.C. (Sept 12, 1919); O/O. A. P. Ledger, M.B.E. (Dec. 5, 1919) (since promoted).

RESERVE OF AIR FORCE OFFICERS.—The following are granted commns. on probation in the ranks stated in the General Duties Branch (May 22):—

CLASS A.—F/Os. A. M. Anderson, D.F.C., A. J. Bott, M.C., H. G. W. Debenham, J. W. Grose, H. A. Love, N. R. Melville, R. K. Rose, J. T. Rymer, H. Sanders, I. Welby, M.C., D.F.C., G. H. Welsh, D.F.C., H. A. Yeo.

P/Os. E. D. Ayre, R. W. Barton, A. J. Brewin, J. P. Crawford, A. M. Dunlop, H. W. Frith, J. A. Harveyson, W. M. Hirons, H. Hollick-Kenyon, T. J. James, H. J. L. Jones, J. C. Montgomery, W. F. A. Snell, L. J. Tripp, W. J. Woodward.

CLASS C.—P/O. T. P. Jenkins

From *The London Gazette*, May 18

R.A.F. GENERAL DUTIES BRANCH.—F/O J. M. Adams is granted a perm. commn. in rank stated (Sept. 16, 1919) (since transferred to Stores Branch for accountant duties); the notification in *Gazette* of Sept. 16, 1919, apptg. him to a short service commn. is cancelled.

A/Cmdre. C. L. Lambe, C.B., C.M.G., D.S.O., is placed on half-pay Scale A (Mar. 1). The notification in *Gazette* of Dec. 5, 1922, concerning F/O. R. Lamb is cancelled

RESERVE OF AIR FORCE OFFICERS.—CLASS A: The following are granted commns. on probation in the ranks stated in the General Duties Branch:—

F/Os. G. Cameron, W. Cameron, J. A. Craig, D.F.C., S. A. Dismore, C. H. Graham, J. Hart, E. A. Jones, A. N. Kingwill, C. B. J. Lancaster, A. T. Maxwell, B. R. Millar, J. H. Paton, A. Russell, J. Snedden, G. C. Walker, G. F. Yuill (May 15).

P/Os. G. C. H. Dorman (May 8), P. G. Addie, D. C. Bain, J. R. Brown, D.F.C., A. Cairnie, C. W. Calder, W. S. Dailey, L. E. Headley, A. Mackenzie, G. E. Muir, G. W. Perks, L. R. Robertson, J. F. Turpie, A. Wren (May 15).

CLASS C.—F/O. I. G. G. Edgar is transferred from Class A to Class C (May 1). O/O P. J. Bradley is transferred from Class B to Class C (May 1).

Week ending May 29.

GENERAL DUTIES BRANCH.—Group/Capt. R. Gordon, C.B., C.M.G., D.S.O., to R.A.F. Depot, 5/5, on transfer to Home Estab. pending disposal.

Wing/Cmdrs. J. T. Cull, D.S.O., to R.A.F. Base Gosport, 1/5, to command R.A.F. Unit in H.M.S. *Hermes* (on commissioning); W. L. Welsh, D.S.O., A.F.C., to R.A.F. Base, Gosport, 1/5, to command R.A.F. Unit in H.M.S. *Eagle* (on commissioning).

S/Ldrs. R. F. S. Morton, to Air Ministry, 1/6; R. J. Mounsey, O.B.E., to Aircraft Park, India, 20/4.

F/Lts. W. P. Groves, to R.A.F. Depot 18/5, pending disposal; R. B. Munday, D.S.C., to R.A.F. Base, Gosport (No. 422 Flight), 29/4; D. K. Cameron, to R.A.F. Base, Gosport, 1/5, for duty in H.M.S. *Eagle* (on commissioning); J. W. B. Grigson, D.S.O., D.F.C., to R.A.F. Base, Gosport (No. 420 Flight), 16/4; D. Gilley, D.F.C., to No. 2 Sqdn., S. Farnborough, 1/6, D. A. Stewart, M.C., D.F.C., A.F.C., to No. 7 Sqdn., Bircham Newton, 1/6

F/Os. G. F. E. Harrison and E. C. Usher, to Experimental Section, R.A.E., S. Farnborough, 1/6; S. T. Clemens, to R.A.F. Base, Calshot, 1/6; B. I. Carter, to R.A.F. Base, Gosport, 16/5, for duty in H.M.S. *Eagle* (on commissioning); H. J. Berthon, S. P. George, H. R. B. Howell, J. B. Knocker, G. McClintock, L. W. H. Phillips, H. V. Smith, D.C.M., F. P. Smythies and O. K. Stirling Webb, to No. 1 F.T.S., Netheravon, 14/5, for course of instruction on appointment to S.S. Commissions; J. R. Bowring, M.C., to No. 1 F.T.S., Netheravon, 14/5, for course of instruction on secondment from Army; A. P. C. Hannay, M.C., to No. 20 Sqdn., India, 18/4; E. W. Logsdail, to R.A.F. Base, Leuchars, 5/5; S. H. Reynolds, to R.A.F. Base, Gosport, 1/5, for duty in H.M.S. *Hermes* (on commissioning); W. H. Jinman, to R.A.F. Base, Gosport, 1/5, for duty in H.M.S. *Hermes* (on commissioning); H. Stafford, to R.A.F. Depot, 1/6, for duty at Chemical Warfare Experimental Station, Porton; R. C. Wansborough, to R.A.F. Depot, 15/4 (Non-effective Pool), on transfer to Home Estab.; J. U. McKinnon, to R.A.F. Depot, 22/5, on appointment to a S.S. Commission.

P/Os. J. B. Wilson, to R.A.F. Base, Leuchars (No. 401 Flight), 1/6; F. G. Cator, to R.A.F. Base, Leuchars (No. 440 Flight), 29/4; J. G. Shackleton, W. A. C. A. Yearsley, C. Denison, G. F. Reeves and M. B. F. Watson, to R.A.F. Depot, 12/5, pending disposal; L. Young, to R.A.F. Base, Leuchars, 22/5, pending disposal; F. Boston, A. R. Buchanan, H. I. Cozens, D. T. H. Hooke, A. S. Lewis, J. H. Pledger, J. R. Pocock, H. M. Scholefield, R. T. Taaffe and N. J. Wiltshire, to No. 1 F.T.S., Netheravon, 14/5, for course of instruction on appointment to S.S. Commissions; A. Thomson, to No. 11 Sqdn., Andover, 22/5; R. H. S. Spaight, to No. 24 Sqdn., Kenley, 21/4, on appointment to a permanent commission from R.A.F. Cadet College, Cranwell.

MEDICAL BRANCH.—Group/Capt. (Medical), N. J. Roche, O.B.E., to No. 1 School of T.T. (Boys), Halton, 18/5, for duty as P.M.O.

F/Lts. (Medical) T. Sheehan, to R.A.F. Base, Calshot, 14/5; T. C. St. C. Morton, M.D., D.T.M., T. M. Walker and H. Steele (Q.M.M.), to H.Q., Palestine Command, 5/5, pending disposal; F/Lt. (Dental) C. F. Pitt, to No. F.T.S., Netheravon, 7/5.

F/Os. (Medical) K. R. Smith, M.D., D.P.H., to School of Naval Co-op., Lee-on-Solent, 14/5

STORES AND ACCOUNTANTS BRANCH.—S/Ldr. (Stores) L. Auker, O.B.E., to R.A.F. Depot (Non-effective Pool), 11/3, on transfer to Home Estab.

F/O. (Stores) H. T. H. Copeland, to No. 1 School of T.T. (Boys), Halton, 22/5.

The Independent Force Dinner.

The fifth Annual Reunion Dinner of the Independent Force, including all officers of Army Troops and other attached Units, will be held at the Hotel Cecil on Tuesday, June 26, at 7.45 p.m. for 8 p.m.

Air Chief-Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., A.D.C., will be in the Chair.

Evening dress with miniatures will be worn.

Tickets, price 15s. (excluding wines), may be obtained from the Hon. Sec. I.F. (R.A.F.) Dinner Club, Room 546, Adastral House, Kingsway, W.C.2, to whom any alteration in address should be sent.

The Middle East Dinner.

Air Vice-Marshal Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O., Air Member for Supply and Research on the Air Council, will take the Chair at the Middle East Dinner at the Café Royal, Regent Street, on Wednesday, June 6. The guest of the evening will be Major-General Sir E. Ironside, K.C.B., C.M.G., D.S.O., Commandant of the Staff College, Camberley, and previously G.O.C. Forces in North Russia, who was intimately connected with the R.A.F. in Persia and Mesopotamia during the War 1914-18. Air Vice-Marshal Oliver Swann, C.B., C.B.E., Air Member for Personnel, who commanded the R.N.A.S. in the Mediterranean during the War and who more recently commanded the R.A.F. in the Mediterranean, will also be a guest.

Among the old Middle Easters who are attending the Dinner are the Director of Civil Aviation, General Sir Sefton Brancker, who commanded the Middle East for a period in 1917-18, G/Capt. A. G. Board, who commanded the original Egyptian training wing, Brig.-Gen. P. R. C. Groves, who was M.E. Staff, G/Capt. Burnett, Lieut.-Col. Tennant, who commanded R.F.C. in Mesopotamia, Major Arnold Graves, commonly known as "Father," from whom Col. Tennant took over, and a number of other Middle Easters from places so far apart as Cornwall, Ireland, Paris and Scotland.

Strictly speaking the issue of tickets closed on May 26 but no doubt late applicants will be accommodated if they apply promptly to F/Lt. G. C. Anne, 62, Kensington Mansions, Earl's Court, W.5.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR WEEK ENDING MAY 20

TRIPS PER DAY.—Monday, 20; Tuesday, 20; Wednesday, 13, Thursday, 19, Friday, 20; Saturday, 15; Sunday, 2.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 23*, passengers 205, freight 6,774 lbs.; Air Union, machines 13†, passengers 27, freight 27,045 lbs. Total machines 36, passengers 232.

LONDON—BRUSSELS—COLOGNE:

Instone Airway, machines 24*, passengers 93.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 34, passengers 96; Aero-Lloyd, machines 2, passengers 2.

LONDON—ROTTERDAM: K.L.M., machines 12, passengers 20

SPECIAL MACHINES: LONDON—MALTA:

De Havilland, machines 1, passengers 1.

Total number of trips by British machines: 81, carrying 394 pas. Foreign machines: 27, carrying 49 pas.

STATISTICS

For week ending May 20:—

Machines, 109; Passengers, 444; Crews, 177, Total Personnel, 621.

Corresponding week last year:—

Machines, 114; Passengers, 215; Crews, 186; Total Personnel, 401.

Corresponding week, 1921:—

Machines, 75; Passengers, 230; Crews, 90; Total Personnel, 320.

Corresponding week, 1920:—

Machines, 84; Passengers, 163; Crews, 87, Total Personnel, 190.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 9; Tuesday, 19; Wednesday, 16; Thursday, 19; Friday, 20; Saturday, 13; Sunday, 3.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 25*, passengers 184, freight 4,515 lbs.; Air Union, machines 16†, passengers 26, freight 19,815 lbs. Total machines 41, passengers 210.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 23*, passengers 67, freight —.

MANCHESTER—LONDON—AMSTERDAM:

Daimler Airway, machines 28, passengers 62, freight —.

LONDON—ROTTERDAM:

SPECIAL MACHINES:

De Havilland Hire Service, machines 3, passengers 1.

K.L.M., machines 10, passengers 11, freight —.

Total number of trips by British machines: 79, carrying 316 pas. Foreign machines: 26, carrying 37 pas.

STATISTICS.

For week ending May 27:—

Machines, 105; Passengers, 353; Crews, 175; Total Personnel, 528.

Corresponding week last year:—

Machines, 162; Passengers, 337; Crews, 198; Total Personnel, 535.

Corresponding week, 1921:—

Machines, 89; Passengers, 350; Crews, 106; Total Personnel, 456.

Corresponding week, 1920:—

Machines, 91; Passengers, 138; Crews, 98; Personnel, 236.

† Some machines are freighters only.

* These machines also carry loads of freight.

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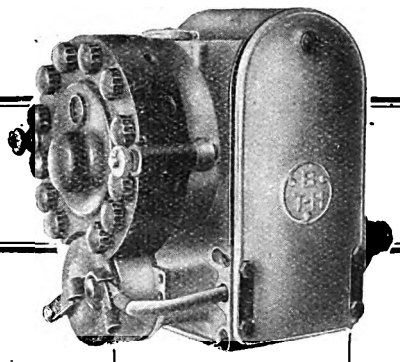
Aero Magnetos.



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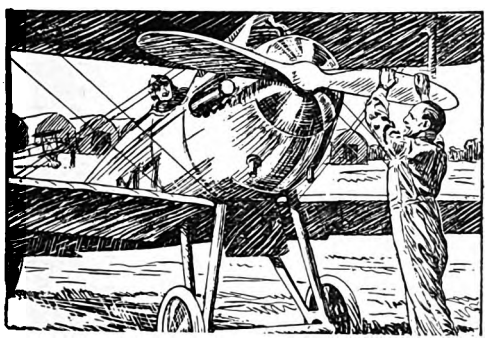

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Croydon Notes.

The most exciting event of the past week was the arrival at the aerodrome of a Napier-engined Vickers "Vulcan." F/O. Hamilton landed here with the machine *en route* from Martlesham on Wednesday evening in pouring rain. Mr. Cockerell then took the machine over and flew it to Brooklands on Thursday evening.

Earlier in the day Mr. Cockerell came over on the old familiar Instone Vickers "Vimy" the famous "City of London." This machine is now in its fourth year and has its old type wings back again. Although it is a veteran in years for actual milage flown it cannot compare with the Daimler veteran, G-EBBS.

An amusing story is going the rounds at Croydon. A stray pilot with quite good recommendations who shall be known as Mr. X was given a job by the Bristol Company to take two machines to a foreign country. He started from Bristol on the first but landed shortly afterwards with a seized engine. When Mr. Uwins flew over to give him help he found him in such a small field that he (Mr. Uwins) would not risk landing beside him but chose a huge field quite near by.

Mr. Uwins inquired why he had gone for a little field instead of for the big one. Said Mr. X "Well you see I was about 6,000 ft. when the engine conked so I saw the big field and made a straight for it but when I was still quite high the big field went by and so I held on and the machine just landed here."

Nothing daunted Mr. X started off for Croydon on another machine. After various vicissitudes he reached Farnborough where he landed as his map finished here. He was pointed in the right direction for Croydon and pushed off. The next that was seen of him was when Mr. Raynham who was flying the Handasyde monoplane above the clouds at Brooklands saw the machine pass.

Some minutes later Mr. Raynham landed and after a short interval Mr. X landed on his Bristol and inquired the way to Croydon. Mr. Raynham pointed him straight at Croydon and pushed him off.

Meanwhile Mr. Shaw was anxiously awaiting him at Croydon. He could get no news after Mr. X had left Bristol and was just shutting up for the night at about 20.30 hrs. when the telephone rang and Mr. X informed Mr. Shaw that he had landed at Hounslow and please what was he to do. Mr. Shaw told him to stay where he was and start first thing in the morning. Meanwhile Mr. Shaw informed Bristol of the state of hostilities at the close of play.

First thing in the morning an urgent message came to Mr. Shaw from Bristol asking him if he would take the machine to its destination. Mr. Shaw then dashed over to Hounslow and flew at once to Croydon, filled and reached the machine's foreign destination with alacrity and despatch. Mr. Shaw certainly deserves bouquets or a handle to his name or something for his habit of rendering aid in emergency. He is becoming a kind of stock Good Samaritan.

Mr. Hinchliffe took the Berlin Daimler machine on Monday and had six passengers out and four home on Tuesday. No German machine came through. Compared with the D.H.34 the Dornier is very slow. Recently against a head wind it started from Amsterdam for London an hour before the D.H.34 and the latter reached Croydon a few minutes before it.

Mr. L. A. Walters has now joined Handley Pages as a pilot. He has until recently been in the East with the R.A.F. flying Handley Pages.

The Surrey Flying Services have been carrying joyriders every day at Croydon and their Portsmouth tour is going well.—G. D.

THE TRIALS OF THE GNOSSPELICOPTER.

The Blackburne-engined light aeroplane designed by Major Gnosspelius and built at Short Bros.' works at Rochester made its first flights on the afternoon of Saturday, May 26.

Thanks to the intervention of Gen. Bagnall Wild, Director of Research, permission was obtained to use Lympne aerodrome.

The machine was loaded on a four-ton lorry on Saturday morning and taken to Lympne by road, arriving at the aerodrome about 1.30. At about 3 p.m. the machine was erected.

After placing ½-gallon of petrol in the tank, Mr. J. Lankester Parker took his seat in the machine, the airscrews were turned over two or three times with the switch off, and the engine started at the first attempt. Mr. Parker ran the engine on the ground for a few seconds, opened up, and took off after a run of 70-80 yards in a dead calm.

The machine ascended steadily, reaching some 200 ft. or so in a mile from the take-off, and Mr. Parker then flew round for a little over 12 minutes, climbing to 1,000 ft, descending to the aerodrome, and again climbing to 1,500 ft.

The machine was obviously under perfect control and gave one the impression of being distinctly fast. The first landing was somewhat bumpy, as Mr. Parker had not become accustomed to landing with his seat six inches from the ground. He received an exaggerated impression of his speed over the ground owing to his nearness thereto, and as a result stalled at about 18 inches from the ground when he was expecting to travel another 50 yards before alighting.

The only damage was the cracking of his seat, which was speedily replaced by a spare discovered at the aerodrome, and after tea, the machine was again taken up.

Mr. Parker took the machine up to a height of 2,500 ft on this trip, which lasted a little over 20 minutes, and terminated only because it was bitterly cold at any height. Towards the end of the flight he came down close to the level of the aerodrome and flew past the spectators, giving an impression of a really high speed and landing perfectly.

The maximum air speed indicated during these trials was 65 m.p.h., but this appears to be certainly lower than the real speed, for it was only observed when climbing. If the machine was levelled up the engine revs. increased but the air-speed indicator dropped, suggesting that the Pitot tube was in a bad position for correct readings.

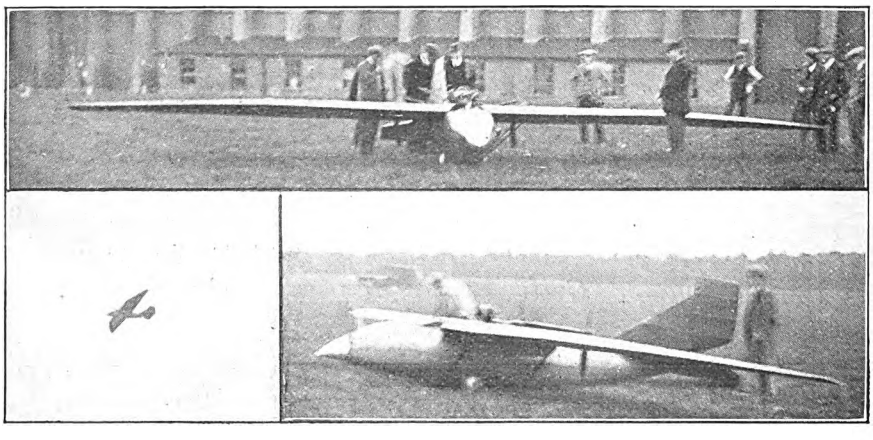
The machine has an astonishingly flat glide at a speed of about 60 m.p.h., and handles as well gliding as flying level. The minimum speed reached in the air was about 30 m.p.h., but the actual minimum—as indicated by Mr. Parker's first landing—must be nearer 20 m.p.h.

The 697 c.c. Blackburne engine ran excellently, without the slightest irregularity or vibration, and the chain transmission to the airscrews seemed to be perfectly satisfactory. The engine makes surprisingly little noise and sounds to be running absurdly slowly. It was actually running at a maximum of about 2,500 r.p.m., corresponding to some 15 b.h.p., so that there is plenty of reserve in hand if the designer cares to modify the airscrews and to speed up the engine.

The trials suggest the advisability of minor modifications, the most important being the provision of slightly larger diameter wheels. Those at present fitted give a very small ground clearance, and only allow a small ground angle of incidence, consequently the machine has to be taken off and landed at an unnecessarily high speed.

But the general impression given by the machine to one who has become accustomed to the sight of modern commercial aircraft labouring off the ground is that at last a machine has been produced which has really ample power available.

The machine was fitted with specially light aeroplane instruments made by S. Smith and Sons Ltd. These included a special air-speed indicator reading from 10 to 80 m.p.h., a revolution indicator and aneroid and an oil pressure gauge.—W. H. S.



THE GNOSSPELICOPTER. — The first twin-screw light aeroplane. This machine was designed by Mr. Oscar Gnosspelius (whose name is giving a lot of trouble to the daily press), and built by Short Bros. of Rochester, the famous seaplane makers. It was tested on May 26 at Lympne by Mr. Lankester Parker, the pre-war pilot of the Lakes Flying Company. Its Blackburne engine drives two screws through chains and sprockets.

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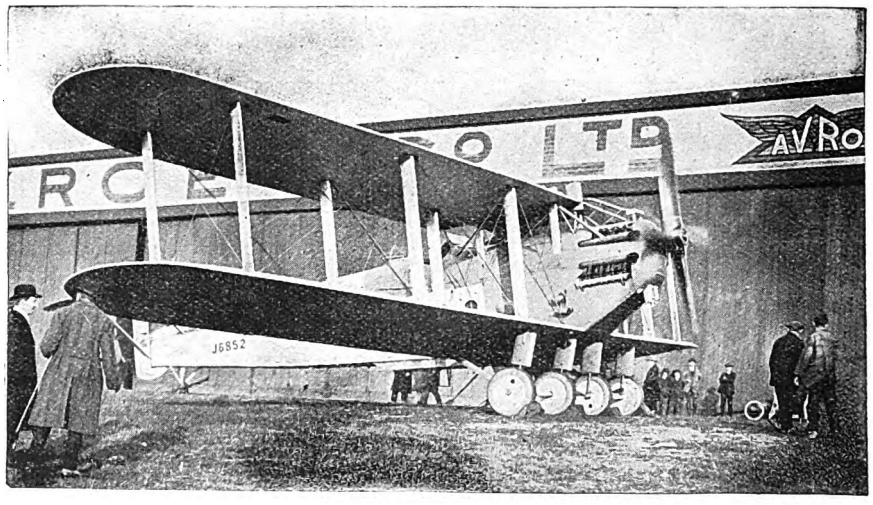
AVRO LEADS AGAIN!



THE machine illustrated is the 1000 h.p. Avro-Napier Bomber, which was successfully taken into the air in December last.

It is the most powerful single-engined aeroplane in the world and was designed and constructed by A. V. ROE & CO. LTD., of Manchester, London, and Southampton.

The Most Powerful Single-Engined Aeroplane in the World.

THE 1000 h.p. Avro-Napier Bomber, which has proved so successful in flight, marks another step forward in Aviation. Never before has a machine with such a high-powered engine taken the air successfully. It is significant that this aeroplane was designed and constructed by A. V. ROE & CO. LTD., and it is a great tribute to their organisation and resources.

This Bomber is a further development of the AVRO "Aldershot," which won the Air Force Handicap at the last R.A.F. Pageant. It is fitted with dual control, and the whole of it, with the exception of certain parts of the wings, is constructed of metal. The wings are designed to fold back so as to economise space when the machine has to be stored.

A. V. ROE & CO. LTD. invite inquiries for information concerning the building of machines for special purposes, or for the supply of AVRO standard aeroplanes or seaplanes.

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ON THE BIRTHDAY HONOURS.

As is usual the Royal Air Force comes in for its share of honours on the occasion of the official Birthday of His Majesty the King. The list of honours will be found in its proper place on page 416.

The promotion of Sir John Salmond is by no means unexpected. In the Air Force Estimates produced in 1922 power was taken to create and provide for a second Air Marshal, Sir Hugh Trenchard then being of that rank. One ventured to suggest at that time in THE AEROPLANE that the Air Officer Commanding in Mesopotamia should at least be of rank equivalent with a substantive Lieutenant-General in the Army. To this rank Sir John Salmond has now been promoted and all who have served under him or with him will be glad at this further step in what has already been a remarkable career in so young an officer. One would, however, like to congratulate Sir John Salmond on behalf of those concerned with aviation who have not had the honour of serving in the Royal Air Force.

Air Vice-Marshal Vyvyan's promotion to K.C.B. will rejoice everybody in the R.A.F. especially in the Coastal Area which he has so long commanded not merely with distinction but in such a way as to win for himself the sincere personal affection of all his subordinates. None can accuse the present writer of being over-sympathetic to the Navy or over-appreciative of Naval Officers. Therefore one can say the more sincerely that if all the officers sent or lent to the R.A.F. by the Navy had been of Sir Arthur Vyvyan's type there would never have been any trouble between the seagoing and the shoregoing sides of the Air Force and the whole Air Force would have been filled with respect for the Navy instead of feeling as they do to-day towards that Service. All will hope that Sir Arthur Vyvyan may long continue to be in charge of the Naval side of Aviation.

Air-Commodore Longcroft's C.B. will equally be regarded with satisfaction by everybody and all will hope that it is merely the forerunner of a further step in the same Order. Commodore Longcroft was one of the most highly esteemed Brigade Commanders of the R.F.C. and R.A.F. during the war, and to him was committed after the war the difficult and delicate task of founding and forming the R.A.F. Cadet College at Cranwell. That he should have been selected is a proof of Sir Hugh Trenchard's ability to judge the worth of a man. A bad choice for such an appointment would have ruined the whole tone of the regular R.A.F. officers of the new generation for many years to come, but happily the choice was all that the most critical could desire and the Cranwell Cadet of to-day when he joins his regular unit is in no way inferior to the output of Sandhurst and because of the technical side of his training he is markedly superior in many ways.

Of necessity Commodore Longcroft must very soon leave Cranwell, his tour of service in that command being almost over. It is generally understood in the R.A.F. that his successor is to be Air-Commodore Amyas Borton who during the last six years has made such a remarkable reputation for himself in the Middle East, especially in Mesopotamia. Sir Hugh Trenchard's second choice for the Cranwell command is worthy of his first choice and everybody will wish both Commodore Longcroft and Commodore Borton equal success in their new commands.

Air-Commodore Halahan also has deserved well of his country. He has what is probably the unique distinction of being the one Government official who "axed" himself under the Geddes scheme. After having done remarkably valuable and highly successful work as chief of the Aeronautical Inspection Department he came to the conclusion that the chief of that Department could be better spared in the scheme of economy than anybody else so he recommended the abolition of his own office. He is now doing a Senior Officers' course at the Naval Staff College. For both these gallant efforts he has more than deserved the C.B.E.

Of the recipients of the Air Force Crosses, S/Ldr. Wells has been the explosive expert of the Experimental Establishment, Isle of Grain, and has been responsible for the smoke screens and other mephitic effects in the last two Air Force Pageants. He has done much remarkable flying under strenuous circumstances. S/Ldr. Payn is the chief test pilot at the Air Ministry and is considered by all the constructors whose machines he has flown as being equal if not superior to any pilot who has ever been engaged on this work.—C. G. G.

ON WHAT IS THE MATTER WITH THE ROYAL AERO CLUB?

Members of the Royal Aero Club some time ago received from the Secretary a circular dated Apr. 26, drawing their attention to the fact that the late Chairman of the Club, Lieut.-Col. J. T. C. Moore-Brabazon, had at the General Meeting laid stress upon the point that owing to the increasing number of members residing abroad the Club premises were not used to a sufficient extent and the Club was able to provide luncheons, dinners, etc., for a larger number than it did at present. Attention is drawn in this circular to the fact that the annual subscription is seven guineas and that there is no entrance fee. The Committee hope that existing members will use their endeavours to introduce new members.

The Royal Aero Club being the governing body of the Sport of Aviation in this country is not as other clubs are the private concern of the members. It is a public body and is therefore open to criticism as much as are the Houses of Parliament, which have been described as the best club in England. There is no reason why the Royal Aero Club should not be for its size the best Club in England if it were properly managed. The fact that the Club premises are not used to a sufficient extent is not owing to the number of members residing abroad it is simply owing to the shocking bad management of the Club itself.

The Attractions.

So far as the catering is concerned there is no Club in London which gives better value to its members. Mr. Frisbee the Club Steward is not only one of the best judges and most skilful buyers of solid and liquid stores in any catering establishment in this country but he sees that the kitchen produces a finished product worthy of the raw material which he puts into it. Both the food itself and the cooking at the Royal Aero Club though simple is of the very best and Mr. Frisbee takes the keenest personal pride in seeing that every member's individual tastes are satisfied. Besides this the prices both for lunch and dinner are astonishingly low and one has yet to discover any other feeding place in London where one gets as good value.

The Club premises are situated in certainly the most convenient place for all who have to do with aircraft. Practically everybody concerned with aviation comes into the sacred quadrilateral bounded by Piccadilly, Bond Street, Oxford Street and Regent Street at some time during the day, especially at night when going to a show of any kind. The Headquarters of the S.B.A.C. are only a few minutes' walk from the Club so that members of the S.B.A.C. attending meetings would under normal circumstances naturally lunch at the Club before going to their meetings. In fact many of them do so.

The two streets in which the Club is situated are comparatively free from heavy traffic and the police are most lenient in the way in which they allow members to leave their cars alongside the Club during meal times and for long periods at other times. The Club rooms themselves are extremely comfortable and pleasant. Therefore on every ground there is every reason why the Club should be a highly popular institution.

The Detractions.

The one drawback to the Club and the one thing which prevents it from being the success which it ought to be is the behaviour of an extremely small minority of members, who have in the Club very much the same effect which the Glasgow Communist Members of Parliament endeavour to have in the House of Commons. That is to say their behaviour makes it impossible for the Club to be what it ought to be.

There is really no need to indicate the precise nature of their behaviour and if one attempted to analyse it there

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would be some difficulty in naming any one particular act for which any one of this minority of members could be justifiably expelled from the Club. But it is none the less a fact that this small minority makes the Club a place to which one cannot with safety to one's own reputation take a member of any first class London Club. And until one can do so the Royal Aero Club will not only be unworthy of its name but will not be a financial success.

In case it may be thought that one is too severe or is merely being priggish or snobbish one would merely ask any Member of the Committee of the Club whether he would care to bring to lunch or dinner in the Club, but more especially to dinner, a member of say the Senior United Service Club or of the "Rag." or even of one of the junior Service clubs where manners are perhaps more free and easy?

Or to put the case slightly differently one would ask even the most junior member of the Royal Aero Club whether he would dare to take there for a meal a middle-aged uncle from whom he has present or future expectations? Or would he take there a respectable and important business man with whom he wished to fix up a business deal? Personally one would like to make a small bet that the answer in each case would be in the negative.

Reasonable Expectations.

Of course one does not expect the Royal Aero Club, providing as it does particularly for aviators, to comport itself with the dignity of the Athenæum but one does at least expect a standard of general conduct among the members equivalent to that which obtains in any ordinarily well-conducted London Club. The fact that such a standard is not attained or maintained by a small minority of the members accounts for the fact that the better class members have ceased to frequent the Club, and it is entirely the fault of the Members of the Committee that the requisite standard of seemliness is not maintained.

If the Members of the Committee themselves made a habit of lunching and dining at the Club and had the pluck to go and say a few kind paternal words to those members whose conduct is not quite as it should be the whole atmosphere of the Club would alter in a very short time.

Naturally one does not expect the whole Committee, most of whom have homes of their own, to make a habit of lunching and dining at the Club every day. But one does suggest quite seriously that for the good of the Club, which means the good of British Aviation, the Committee should make among themselves a kind of agreement that one or two of them will dine and lunch at the Club every day until things become what they should be.

A Reason for Being.

Apart from the Committee the Club has a most imposing list of patrons, councillors and so forth, yet so far as one can discover none of these distinguished gentlemen takes sufficient interest in the Club to use the Club as a club. The Members of the Committee should therefore make it their business to persuade these distinguished personages to feed at the Club with decent frequency so as to help to impart to it the necessary tone.

One has frequently been puzzled to explain the reason for the Council of the Royal Aero Club. So far as one can discover the Council never meets and its individual members seldom if ever do anything for the good of aviation. Here now is an excellent opportunity for these exalted members of the Nobility and Gentry to do something to justify their connection with flying. If they do not fly they can at least eat for the progress of aeronautics. If they were to arrange a regular roster for duty at the Royal Aero Club and were to undertake in turn the duties of *censor morum* of the less important though (unfortunately) not necessarily younger members they would at any rate show a reason for being members of the Council of the Club.

The Club has a goodly membership roll and quite a big income in subscriptions yet a very small percentage of the members, even of those living in and near London, use the Club with any regularity for the reasons stated hereinbefore. It is the business of the Committee to see that such reasons cease to exist.

The remedy is entirely in the hands of the Committee as indicated and it is no use circularising existing Members and asking them to discover new members when as every decent member of the Club knows they would only be damaging their own reputations by trying to induce any of the best people to join the Club. Before the better class member of the Royal Aero Club will introduce new members the present membership roll of the Club must be swept and garnished.—C. G. G.

THE R.A.F. PAGEANT.

H.M. the King has graciously consented to be present at the R.A.F. Pageant on June 30.

Among machines which will be demonstrated will be the Supermarine "Seagull," Blackburn "Dart," Vickers "Victoria," Vickers "Vernon," Boulton & Paul "Bourges," all with Napier "Lion" engines, the Avro "Aldershot" with Napier "Cub," the Armstrong-Whitworth "Siskin" of revised type, the "Westland "Weasel" with Siddeley "Jaguar," a Gloucestershire "Mars VI" with Bristol "Jupiter" engine, probably the new Bristol "Fighter" with "Jupiter" engine, and the 3 h.p. "Wren."

The set-piece is to be the bombing of a bridge.

THE KING'S CUP RACE.

The Race for the King's Cup which was to have taken place on the 20th and 21st July will now take place on the 13th and 14th of July. The start and finish will be at Hendon.

THE AIR MENACE.

On May 30 the Air League of the British Empire after a long period of somnolence called a meeting at the Mansion House the purpose of which was to point out the danger threatening this country and calling for the establishment of a one-Power standard in the Air.

Lord Birkenhead was the principal speaker and he moved "That National security demands the establishment of a one-Power standard in the air and our commercial prosperity the fullest development of the Imperial Air Routes and British civil aviation generally, and that the Air League in its efforts to achieve these aims, is deserving of the fullest support." In his speech he expressed those same very sound views that he has been expressing since his disagreement with the Geddes Act of retrenchment.

Sir Alan Anderson, who seconded the motion, said that he would like to see civil aviation made the first object, for that would give us what we needed. He seems to forget that for civil aviation to be a success it must be a commercial proposition. To spend Government money on commercial aviation with the ultimate object of making use of the comparatively few pilots and trained personnel and the very inefficient aircraft instead of spending it direct on the Air Force will not guarantee a one-Power standard in the air in the way needed, that is fighting strength, not numerical strength, with the minimum waste of money.

Admiral Mark Kerr proposed the vote of thanks and Sir J. Shelley-Rolls seconded this vote, which was cordially approved.

On May 31 a letter setting forth the same sentiments expressed at the Mansion House meeting was circulated to the daily Press over the following signatures:—Lord Askwith, Lord Montagu of Beaulieu, Lord Birkenhead, A. S. Benn, Sir Woodman Burbidge, Lord Burnham, Philip S. Foster, Sir Robert Horne, Admiral Mark Kerr, the Duke of Northumberland, General J. B. Seely, Sir John Shelley-Rolls, Sir James Stevenson, G. Holt Thomas, John Walter and Sir John Ward.

It would appear that the Air League has at long last awaked to the reason for its existence. It is now possible for it to elevate itself to the enviable position held by the old Navy League which it now ought to supersede owing to the promotion of the Royal Air Force to the position of our First Line of Defence. But it will have to show very much more energy in the next six months than it has shown in all its previous years of existence put together.

THE NORTH-EAST COAST AERO CLUB.

The North-East Coast Aero Club which has its headquarters at the Crown Hotel, Newcastle-on-Tyne, appears to have been doing some very good work of late. During the early part of this year a number of well-attended lectures have been given as follows:—Jan. 11: "Flying," by T. H. Lowe, who also gave one on "Aeroplane Design" on Jan. 25. Feb. 8: "Timber," by A. Peacock. Feb. 22: "Movement in Structures," by A. Rutherford (Hon. Sec.), who also lectured on May 3 on "Internal Combustion Cycle Engines." March 22: "Model Aeroplanes," by R .N. Bullock, and April 19: "The Preparation of a Machine for Flight," by L. Tate. On April 5 a discussion was held on "Ornithopters."

TO R.A.F. INVALIDS.

A former Officer of the R.A.F. has placed in one's hands a sum of money which he wishes to be devoted to the relief of crashed, wounded or invalided R.A.F. officers who are in difficulties. The donor of this gift was severely injured early in the War and the sum which he is now devoting to the help of others is the product of his own gratuity plus his disability pension.

His wish is that it should be applied to the help of former R.A.F. officers who find themselves in need of financial help owing to the effects of active service. For example if an ex-officer has a chance of getting a job in civil life but before taking it up needs a small operation or course of treatment or a brief rest cure in order to fit himself to do good work then some of this money can be used to help him. Any readers of this paper who know of thoroughly deserving cases are invited to communicate with C. G. Grey at this office.

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The International Air Congress, London, 1923

(June 25 - 30).

PROGRAMME.

Monday, June 25th.

10.0 a.m. Opening Ceremony at the Institution of Civil Engineers, Great George Street, Westminster.
Inaugural Address by His Grace the Duke of Sutherland.
2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers, Great George Street, Westminster.
9.0 p.m. Official Reception of Members by the President (His Royal Highness the Duke of York, K.G., K.T.), in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, S.W.1.

Tuesday, June 26th.

Visits by Members to various places of Aeronautical Interest.

Wednesday, June 27th.

10.0 a.m. & 2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers.
9.0 p.m. Reception of Members by the Right Honourable the Lord Mayor of London, at the Mansion House.

Thursday, June 28th.

Visits by Members to various places of Aeronautical Interest.
10.0 p.m. Reception of Members by His Grace the Duke of Sutherland, at Hampden House.

Friday, June 29th.

10.0 a.m. & 2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers.
9.0-11.0 p.m. Reception at the Science Museum, South Kensington.

Saturday, June 30th.

10.0 a.m. Concluding Meeting of Members in General Assembly, under the Chairmanship of the Secretary of State for Air (Lieut.-Colonel the Right Honourable Sir Samuel Hoare, Bart., C.M.G., M.P.), at the Institution of Civil Engineers, Great George Street, Westminster.
8.15 p.m. Official Banquet in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, S.W.1.

Terms of Membership.

The Qualification for Membership is nationality of a country which is either a signatory of the International Air Convention, or represented on the Federation Aeronautique Internationale.

The Subscription is One Pound Sterling or its equivalent in Foreign Currencies at date of Application.

Individuals belonging to the Families of Members may become Associate Members at a reduced Subscription of Ten Shillings.

GENERAL SECRETARY, Lt.-Colonel W. Lockwood Marsh,
7, Albemarle Street, London, W.1, England.

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R.A.F. INTELLIGENCE

Appointments.

From *The London Gazette*, May 29.

R.A.F. GENERAL DUTIES BRANCH.—The following are granted short service commns. as Flying Officers for seven years on the active list, with effect from, and with seniority of, May 14:— H. J. M. Berthon (Sub/Lt., R.N., retd.), S. P. George (Lt., Indian Army, retd.); H. R. B. Howell (Lt., R.N., retd.), J. B. Knocker (Lt., Indian Army, retd.); G McClintock (Lt., R.N. retd.), L. W. H. Phillips (Lt. R.N., retd.), H. V. Smith, D.C.M. (Lt., R.A.R.O. Sherwood Foresters), F. P. Smythies (Lt., R.N., retd.), O. K. S. Webb (Sec. Lt., R.A.R.O., R. Irish Fus.).

Wing/Cmdr. I. T. Courtney, C.B.E., is restored to full pay from half-pay (May 25).

RESERVE OF AIR FORCE OFFICERS:—The following are granted commns. on probation in the ranks stated in the General Duties Branch (May 29):—CLASS A: F/Os A. M. Alexander, A.F.C., G. College, L. P. Coombes, D.F.C., G. F. Court, H. Hickson, G. J. King, R. G Lawson, J. M. Leach, H. A. Mason, L. Rimmer, M.M., C. T. Robinson, J. S. Stubbs, D.F.C., A.F.C., W. D. Thom, D.F.C., W. F. P. Williamson, L. A. Wingfield, M.C., D.F.C

P/Os. E. A. Burbidge, K. L. Graham, H. B. Hampson, F. A. Ledgard, O. H. F. Lloyd, C. A. McIntosh, W Mullen, H. Preston, R. G. Spencer, J. E. Taylor, W. A. Warwick, C. M Willy.

Week ending June 4th.

GENERAL DUTIES BRANCH.—Wing/Cmdr. W. F. MacNeece, C.B.E., D.S.O., D.F.C., to R.A.F. Depot (Non-effective Pool), 29/4, on transfer to Home Establishment.

S/Ldrs. B. L. Huskisson, D.S.C., to R.A.F. Base, Leuchars, 11/6; R. S Maxwell, M.C., D.F.C., to R.A.F. Depot, 1/6, pending disposal; R. Graham, D.S.O., D.S.C., D.F.C., to Air Ministry, 1/6.

F/Lts. J. S. Browne, A.F.C., to R.A.F. Depot, 18/5 (Non-effective Pool), on transfer to Home Establishment; W. R. Curtis, to R.A.F. Depot, 21/5 (Non-effective Pool), on transfer to Home Establishment; W. P. Groves to Half-pay List, 1/6.

F/Os. W. V. Simons, to No. 267 Sqdn., Malta, 2/5; A. J. Rankin, to H.M.S. *Pegasus*, 2/5; W. E. Townsend, to R.A.F. Depot, 18/5, on transfer to Home Establishment pending transfer to Reserve; T. C. Tyers, to R.A.F. Depot (Non-effective Pool), 29/4, on transfer to Home Establishment; C. E. F. Arthur, to R.A.F. Depot (Non-effective Pool), 15/4, on transfer to Home Establishment; E. F. Haylock, to No. 1 Sqdn., Iraq, 27/4; G. Lansdowne, D.F.C., to R.A.F. Base, Leuchars, 21/5, on transfer to Home Establishment for duty with No. 443 Flight on formation, E. C. B. Wright, to R.A.F. Depot, 21/5, on transfer to Home Establishment; R. V. Weeks and J. S. Nichol, to R.A.F. Depot, 18/5, pending disposal on transfer to Home Establishment; G. L. Carter, to Armament and Gunnery School, Eastchurch, 1/6; H. S. Hobby, M.C., to No. 4 F.T.S., Egypt, 8/5, instead of 216 Sqdn. as previously notified; F. W. W. Wilson, A. E. Evans, D.F.C., A. Leslie-Moore, R. F. Overbury, F. E. Vernon and H S. Davidson, to R.A.F. Base, Gosport, 4/6, for course of instruction.

P/Os. A. E. B. Bateman and M Wiblin, to R.A.F. Base, Leuchars (No. 403 Flight), 1/6; E. B. Forster, to C.F.S., Upavon, 1/6.

MEDICAL BRANCH.—S/Ldr. (Medical) H. A. Hewat, M.B., D.T.M., to Baghdad Combined Hospital, Iraq, 1/4.

F/Lts. (Medical) T. J Thomas, M.B, to Busrah Combined Hospital, Iraq, 15/3; D. McLaren, M.B., to Baghdad Combined Hospital, Iraq, 1/4; P. A. Hall, M.B., B.A., to Baghdad Combined Hospital, 1/3; T. Montgomery, M.B., D.P.H., B.A., to R.A.F. Depot (Non-effective Pool), 18/3, on transfer to Home Establishment.

F/Os. (Medical) J. B. Gregor, to Aeroplane Exper. Estab., Martlesham Heath, 28/5; W. E. Barnes (since promoted) to Station Commandant, Iraq, 1/4; G. R. Nodwell, M.B., to Basrah Combined Hospital, Iraq, 30/3.

STORES AND ACCOUNTANTS BRANCH.—F/Lt. (Accountant) R. R. Money, O.B.E., to N. 100 Sqdn., Spittlegate, 1/6.

F/Os. (Stores) F. E. C. Finzel, to R.A.F. Depot, 18/5, on transfer to Home Establishment pending transfer to Reserve; R. Blackith, to No. 5 Wing H.Q., Biggin Hill, 1/6; F/O. (Accountant) R. O. Robbins, to No. 39 Sqdn., Spittlegate, 1/6.

The Birthday Honours.

The following is a list of honours conferred on officers of the Royal Air Force on the occasion of His Majesty's birthday:—

The King has approved the promotion of Air Vice-Marshal Sir John Maitland Salmond, K.C.B., C.M.G., C.V.O., D.S.O., to the rank of Air Marshal in the Royal Air Force, in recognition of his distinguished service in Command of the Forces in Iraq. To date June 2, 1923.

K.C.B. (MILITARY DIVISION).—Vyvyan, Air Vice-Marshal Arthur Vyell, C.B., D.S.O., R.A.F.

C.B. (MILITARY DIVISION).—Longcroft, Air Commodore Charles Alexander Holcombe, C.M.G., D.S.O., A.F.C., R.A.F.

C.B.E. (MILITARY DIVISION).—Halahan, Air Commodore Frederick Crosby, C.M.G., D.S.O., M.V.O., R.A.F.

O.B.E. (MILITARY DIVISION).—McKean, S/Ldr. Lionel Douglas Dalzell, R.A.F.; Linnell, F/Lt. Francis John, R.A.F.; O'Neill, F/Lt. Christopher Thomas, M.B., R.A.F.

M.B.E. (MILITARY DIVISION).—Divers, F/O. Rowland John, R.A.F.; Hamilton, F/O. Leslie, D.F.C., R.A.F.; Chandler, O/O. Louis James, R.A.F.; Baker, No 531 Sjt.-Maj., 1st Class, Clarence Herbert, R.A.F.

AIR FORCE CROSS.—Wells, S/Ldr. John Kilner, and Payn, S/Ldr. Harold James.

AIR FORCE MEDAL.—Hughes, 248043 Corp. Herbert Valentine.

The King's Levee.

His Majesty the King held a Levée at St. James' Palace on June 4. H.R.H. Grp/Capt. the Duke of York, K.G., R.A.F., was present, attended by Wing/Cdr. L. Greig.

Among those in attendance upon His Majesty was Air/Marshal Sir Hugh Trenchard, Principal Air A.D.C.

Among the gentlemen who attended the Levée were:—Air/Vice-Marshals Sir G. H. Salmond and A. V. Vyvyan, Air/Commodores C H. Longcroft, D. le G. Pitcher and J. M. Steel, Grp/Capt. F. V Holt and F/Lt. R. F. Leslie.

The following officers of the R.A.F. had the honour of being presented to His Majesty on First Appointment by the Lord President of the Council:—ACLAND, F/Lt. W R., D.F.C., A.F.C.; ARNOLD, S/Ldr. A. R., D.S.C., D.F.C.; GRAHAM, S/Ldr. R., D.S.O., D.S.C., D.F.C.; GRAVE, F/Lt. F., M.B.E.; IVENS, F/Lt. T. S.; PATTINSON, Wing/Cdr. L. A., D.S.O., M.C., D.F.C.; PLAYFAIR, Grp/Capt. P. H., M.C. (on promotion); ROBERTSON, S/Ldr. J. L.; SAVILE, F/O. F. C.; SPEARE, F/O. G. R.; SUTHERLAND, F/Lt. W., M.B.E.

MCCLEAN, Lt./Col. F., A.F.C., by Mr. Mervyn O'Gorman, C.B.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

Sports Board Arrangements.

June 9, Tennis, R.A.F. v. Queen's Club; June 15 and 16, Cricket, R.A.F. v. R.A.O.C. at the Oval; June 23, Tennis, R.A.F. v. Staff College at Camberley.

July 11, Cricket, R.A.F. v. Staff College at Camberley; July 27 and 28, Cricket, R.A.F. v. Greenjackets at St Cross, Winchester.

Aug. 13 and 14, R.A.F. v. R.N., Cricket at Leyton; Aug. 17 and 18, R.A.F. v. Civil Service, Cricket at Leyton.

The President of the R.A.F. Cricket Association hopes that all those who have been in the R.A.F. or are interested in the R.A.F. and happen to be in London will try and turn up at the Oval and Leyton to support the R.A.F. XI

R.A.F. Cricket.

R.A.F. v. Greenjackets:—The first match of the R.A.F. cricket season was played at Netheravon on Friday and Saturday, May 25-26, on a good fast wicket. The R.A.F. won the toss and compiled 243. Plunket bowled very well for the Greenjackets, and took 6 wickets for 82. Marson batted confidently from the start. Pearce, after a shaky start, played a useful innings, and Matthew collected 38 runs with the "long handle." It was a good performance to dismiss the Greenjackets for 86. Adams kept a good length and maintained his pace excellently, and Lawson bowled some very good balls, notably the one with which he dismissed Moore-Gwyn.

On following on the Greenjackets did much better and made 215, most of the side contributing a few. It was fortunate for the R.A.F that Moore-Gwyn was run out—a very clean and smart bit of fielding by Marson and Livock. The Greenjackets could not make up the ground lost in their first innings, and left the R.A.F. only 58 to get to win, the runs being hit off for the loss of two wickets, Livock being 35 not out.

The R.A.F. give promise of being a useful batting side, but some more bowling is sadly needed and the fielding could be greatly improved. The groundwork was very often slovenly and occasionally developed into footwork.

The R.A.F. scores were:—F/Lt Livock, b. Plunket, 19, not out 35; F/Lt. Bumphrey, b. Plunket, 4, not out 2; F/Lt. Marson, c. Skinner, b Plunket, 22, st. Newton, b. Darell, 17; F/Lt. Weaver, b. Plunket, 11; F/O. Wyndham, b. Plunket, 1; F/O Pearce, b. Raymond, 65, b Darell, 3; F/O. Adams, b. Plunket, 2; F/Lt Mathew, c. Hone, b Skinner, 38; F/Lt. Morice, c. Hone, b. Tod, 43; F/Lt. Sugden, b. Tod, 19; F/Lt. Lawson, not out, 5; Byes, etc., 16; Total first innings, 243; Total second innings (2 wkts.), 57.

Bowling Analysis:—Lawson, 4 for 32 and 3 for 64; Adams, 5 for 37 and 1 for 51; Mathew, 1 for 10 and Lawson 2 for 27; Sugden, 3 for 31

The R.A.F. Lawn Tennis Association.

On May 26 the United Services played a match against Queen's Club. Each Service was represented by one pair, and the match ended in a very easy victory for the Services by 8 matches to 1. The R.A.F. pair, F/Lt. J. Duminy and P/O. C. F. Roupell, played very well indeed, and with more practice together should become a first-rate pair. Both players have a good service, and P/O. Roupell is distinctly useful off the ground with a very good forehand drive. Both combine well and are severe overhead.

Results: Pay/Lt.-Cmdr. J. M. Bell and Sub/Lt. A. W. Buzzard (Navy) beat F. Gordon Lowe and M. Temple (3—6, 8—6, 6—4); beat R. J. McNair and G. T. C. Watt (6—1, 6—2); beat G. Millard and H. N. Negretti (6—2, 4—6, 6—3).

Maj. T. Moss and Maj. H. C. Cumerbatch (Army) beat Millard and Negretti (2—6, 6—3, 6—2); beat Lowe and Temple (4—6, 6—3, 6—1); lost to McNair and Watt (7—9, 2—6).

F/Lt. J. Duminy and P/O. C. F. Roupell (R.A.F.) beat McNair and Watt (6—2, 6—4); beat Millard and Negretti (6—2, 6—4); beat Lowe and Temple (6—4, 6—2).

On June 2 the R.A.F. played a match against Roehampton Club. The R.A.F. won by 6 matches to 3. The R.A.F. team all played well and especially the first pair, F/Lt. J. Duminy and P/O. C. F. Roupell, who won all their three matches.

Results: F/Lt. J. Duminy and P/O C. F. Roupell beat G. Jiminez and L. Barber (6—3, 6—4); beat L. Stevens and C. McCormic (5—7, 7—5, 6—3); beat A. D. Stocks and D. R Larcombe (5—7, 6—3, 6—4).

S/Ldr. H. J. F. Hunter and F/Lt. E. Lindop lost to Jiminez and Barber (3—6, 4—6); beat Stevens and McCormic (6—4, 6—2); beat Stocks and Larcombe (6—4, 6—2).

F/Lt. Williamson-Jones and P/O. Stott lost to Jiminez and Barber (3—6, 2—6); lost to Stevens and McCormic (4—6, 4—6); beat Stocks and Larcombe (2—6, 7—5, 6—1).

Golf.

R.A.F. v. WORPLESDON:—The R.A.F. were beaten by Worplesdon on June 2 by 8 matches to 4. The R.A.F. scored as follows:—

Singles: F/Lt. Hayward (5 and 3) 1, Wing/Cmdr. Thompson 0, F/Lt. Bumphrey 0, S/Ldr. Lowe 0, F/O. Fitzgibbon (2 and 1) 1, F/Lt. Parr 0, F/Lt. Fawcus (1 hole) 1, Wing/Cmdr. Brooke 0; Total 2.

Foursomes: Hayward and Thompson (4 and 2) 1, Bumphrey and Lowe 0, Fitzgibbon and Fawcus 0, Parr and Brooke 0; Total 1.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The Annual "Wilbur Wright Memorial Lecture" of the Royal Aeronautical Society, delivered by Dr. Joseph S. Ames, Chairman of the Executive Committee of the United States Advisory Committee for Aeronautics, is briefly reported below.

Dr. Ames touched briefly on only two branches of the experimental work which has been carried out under the Committee's direction, but this account indicates how very thoroughly the work of investigation of important practical problems has been undertaken in America.

So far as Europe is concerned there is no doubt whatever that British-built aero-engines are supreme in the matter of reliability. This fact is undoubtedly due to the extremely thorough methods of testing in use in this country, particularly in the matter of official "Type Tests."

It is pointed out in an article in the following pages that the American Naval Air Service has now adopted a form of type test which—on paper at least—is distinctly more arduous than the British official test, and that at least one American engine has passed this test successfully.

THE WILBUR WRIGHT LECTURE.

The Annual "Wilbur Wright" lecture of the Royal Aeronautical Society was delivered on the afternoon of May 31, 1923, by Dr. Joseph S. Ames, the Chairman of the Executive Committee of the United States Advisory Committee for Aeronautics.

The Lecturer.

Dr. Ames very naturally chose as the subject of his lecture certain of the research work recently undertaken at the Langley Memorial Laboratory, which is under the control of the Advisory Committee, for that work which is very largely of a highly important and practical nature is very justly to be regarded as a direct continuation of the very careful and thorough scientific investigations carried out by Wilbur Wright and his brother Orville which these lectures are intended to commemorate.

The Langley Memorial Laboratory.

The Langley Memorial Laboratory is extremely well-equipped. It has a laboratory for power plant investigations, a large N.P.L. type wind-channel, a new channel in which the air in use can be compressed to 20 atmospheres or more, it has excellently-equipped workshops for the manufacture of instruments, and it has a flying ground and a large fleet of aeroplanes equipped for scientific experimental work. In addition the Laboratory has been able to engage a large staff of thoroughly competent workers. The title of Dr. Ames' lecture—"The Relation between Aeronautic Research and Aircraft Design"—indicates that the subject is more or less confined to investigations having a definite practical end, but as Dr. Ames points out in making these investigations more knowledge is usually obtained than is immediately necessary for the solution of the practical problems which are their first aim, and thus these investigations serve not only their primary purpose, but also add to the stock of fundamental aerodynamic knowledge.

Two very general problems have been put to the Langley Laboratory in the past year by the American Army and Navy.

The Load Distribution on Full-Size Aircraft.

The first of these—actually put in a number of questions—was that of discovering more than was then known of the distribution of forces on parts of aircraft. The specific questions asked were (1) How is the distribution of load over the wing-tip and aileron modified by the plan form of the wing? (2) Why are high-speed aeroplanes subject to such types of accident as the ripping of fabric from the wings and (3) To what forces are the fixed and movable surfaces and the envelope of an airship subject when the ship is making manœuvres.

The distribution of load over wings was tested in the wind-channel. A series of tests was made on model aerofoils with square, elliptical and positively and negatively raked wing-tips. A further series was made on raked wing-tips with various aileron settings. The results gave a large amount of apparently new information as to the distribution of pressure at this part of the wing. With positively raked tips very erratic load distributions occur, which may be avoided by the use of negatively raked tips. From the results accurate computations of the spar loads at wing-tips may now be made.

Tests to discover the nature of the airflow round a high-speed machine were made by pressure-plotting on a specially-equipped Thomas Morse M.B.3 single-seat fighter, which has a top speed of 145 m.p.h. The very ingenious methods for carrying out the very numerous measurements necessary for these tests were briefly described by Dr. Ames, and more detailed accounts of the instruments in use are to be found in the Reports of the Advisory Committee.

The results of these tests are presented in a very graphic manner, either by a pressure-contour map of the machine, or by three dimensioned models, or actual relief maps of pressure in which the pressure on a given part of the machine is proportional to the height of the model above the datum level.

Erratic Pressures on High-Speed Aeroplanes.

These tests showed that the actual pressures on the surfaces of a high-powered machine are extremely far from uniform—some of the more striking facts in the case of the M.B. are that in the slip stream the pressure distribution is extremely erratic. In steady high-speed flight a lift of 100 lbs. per sq. ft. was observed on the leading edge of the upper wing and on the leading edge of the lower right wing a down load of 60 lbs. per sq. ft. was found.

When climbing the lower left trailing edge was subject to a down pressure of 70 lbs. per sq. ft. near the fuselage. A suction on the upper surface—measured relatively to the air inside the wing—of as much as 76 lbs. per sq ft. was found in steady flight, and an inward pressure as high as 24 lbs./sq. ft. was found at another point In flattening out from a dive, the wings were found to support only 80% of the total load on the aeroplane, but in a heavily-banked turn at 150 m.p.h., when the loading on the whole machine rose to 4.2 G. the wings carried 90% of the total.

In steady flight at top speed the upper wings carried twice the load per sq. ft. carried by the lower wings, and the total lift of both wings was 400 lbs. greater than the weight of the whole machine—this representing the down load on body and tail at this speed.

Airship Forces.

The problem of the forces on an airship have been studied by a similar process of pressure measurements on a full-size airship. The ship used was a Navy type C. non-rigid of 200 ft. length and 200,000 cub. ft. capacity.

These tests involved pressure measurements at 400 points over the body and surfaces of the ship, and arrangements were made which allowed the pressure at 260 different points to be recoded simultaneously. The results of this investigation are not yet complete, but certain important and novel facts have been discovered in regard to the forces involved in circling flight.

When the rudder is suddenly put over, and before the ship gains any appreciable angular velocity there is such a large force on the fin surfaces in the opposite direction to that on

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the rudder itself that the resultant force applied to the stern of the ship is much smaller than had been supposed. This means that sudden application of the rudder produces much smaller stresses on the airship as a whole than might have been expected.

"SCALE EFFECT."

The second general question put to the Laboratory was that well-known and very vexed one of "scale effect." The Langley Laboratory has developed unique facilities for the investigation of this very important question.

Their ordinary wind-tunnel with a 5-ft. diameter is fitted so that an air speed of 100 m.p.h. can be maintained.

A free flight method, on which a large model is suspended below an aeroplane in steady flight has been developed and has given results which are on the whole satisfactory.

Another line of investigation is being pursued by the aid of the compressed-air tunnel already mentioned. This tunnel is 5 ft. in diameter, and is entirely enclosed in a steel cylinder with hemispherical ends. The walls of the tunnel themselves are hollow and in the dead space the balance-mechanism is situated. An electrically-operated mechanism allows adjustments of the balance, and readings, etc., of the balance are made through small glass windows.

The air density in the tank is controlled by electrically-driven compressors and any range of pressure from one-tenth of an atmosphere to 20 atmospheres may be obtained According to the theory of similarity, this tunnel operating at its greatest density should be equivalent to a normal tunnel 100 ft. diameter with an air speed of 60 m.p.h.

The usual method of full-scale flight-testing on real aeroplanes is also in use. For this purpose the staff of the laboratory have developed a large number of highly-ingenious instruments which permit of the accurate and simultaneous record of accelerations, angular velocities, control positions and so forth, most of which have been described in the reports of the Advisory Committee.

A new instrument, described by Dr. Ames and known as the "Kymograph Air-speed Meter" gives a record of true air-speed and of the sun's angular position at any instant, and allows the true angle of flight path to be measured. Measurements of gliding angle which are independent of disturbance by vertical currents can be made with this instrument.

With all these facilities available, it is hoped that very rapid progress will be made in the elucidation of the differences between model and full-scale results. The high-pressure tunnel was only put into service in April of this year, consequently the results obtained with it are as yet only to be regarded as provisional, but if the hopes which are entertained of the new methods here described are realised, the work of the Langley Laboratory should greatly increase the accuracy of the aeroplane designer's work.

The lecture was illustrated by a large number of lantern-slides showing the apparatus used, and some of the results obtained in the researches mentioned. The lecture should undoubtedly have the effect of opening the eyes of British Aeronautical engineers to the very valuable and extensive nature of the research work which has already been carried out in the U.S.A. and to the probability of rapid advances in that country.

If Dr. Ames' lecture has the effect of galvanising our own Aeronautical Research Committee into a state of a little greater liveliness it will be of enormous value. If it fails of this effect it will at least direct the attention of British designers to the very large store of useful information which is to be found in the Reports of the American Advisory Committee.

A full report of Dr. Ames' lecture will naturally be published in the Journal of the Royal Aeronautical Society, and a copy of this issue should certainly be in the possession of all who are interested in the science of aeronautics.

THE DEVELOPMENT OF ENGINE RELIABILITY.

It is pretty generally recognised that the future development of aviation depends to a very considerable extent on the improvements which are possible in the reliability of aero-engines. It is perfectly true that absolute and unfailing reliability in any complicated mechanism such as this can never be attained, and that occasional engine breakdowns in flight are certain to occur however much the engine is improved. That is obviously no reason for neglecting the development of aero-engines in this direction.

Very considerable improvements have undoubtedly taken place in this respect since the war. During the latter period of the war itself, the German aircraft authorities instituted a very thorough system of type-testing new engines before they were allowed to enter the production stage. Their test included a 50-hours' endurance run at something in the neighbourhood of full power. It is not by any means certain that they were always able to secure satisfactory passing of this test, but it is certain that some of the war-time German engines stood up to it satisfactorily

Herr Otto Schwaeger, who was responsible for the examination and testing of many samples of captured Allied aero-engines during the war expressed the considered opinion that no known Allied engine could have successfully passed the German type-tests. In this matter he may have been mistaken, but it is pretty certain that only very few of these engines, and those mainly if not entirely of British design and manufacture could have done so.

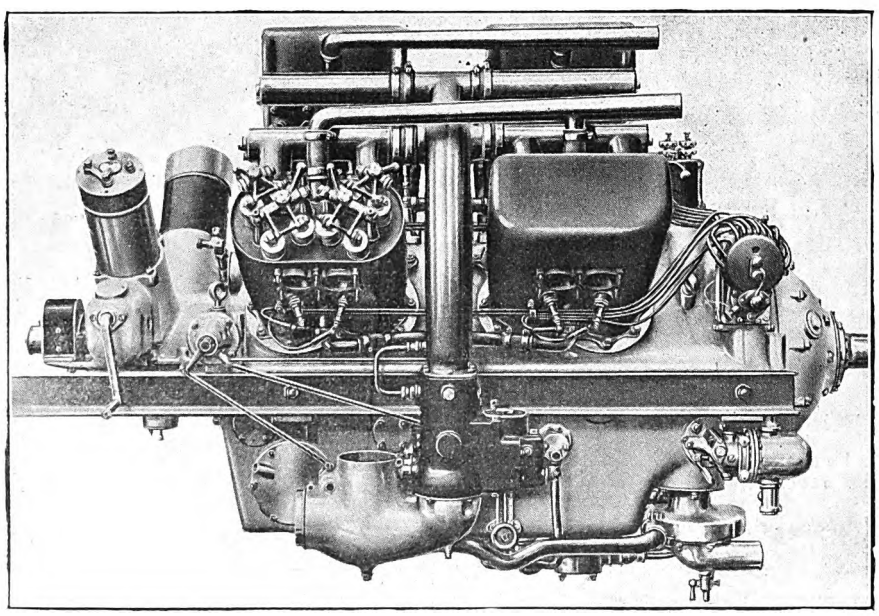
And there is very little doubt that the stringent German tests had the desired results. It is generally admitted that during the war German engines were markedly superior to those of the Allies in reliability.

Since the war there has been a general tightening up in the matter of engine-tests in this country and in others. order for any machine to qualify for a Certificate of Air-

Under the Air Navigation regulations it is necessary in worthiness that the engine installed should be of an approved type and in the case of new engines this involves the passing of a "Type Test."

Originally this test involved 50 hours' run in spells of not less than 10 hours each at 90% full power. More recently the 50 hours' run has in some cases been made non-stop. And as the stringency of the Type Test trials has increased, so has the practical reliability of the aero-engine improved. Quite a number of British engines have now passed the 50-hour endurance test with ease—and one at least—the Napier "Lion" has made a 150-hour run at 90% of full power without any adjustment.

In practical commercial service British aeroplane engines



A NEW FRENCH ENGINE.—The new 12-cylinder "broad arrow" type Farman engine which after a long period of experimental development has just successfully passed the 50-hours' endurance test under the control of the French "Section Technique."

This engine is fitted as a standard with an electric generator and starter, an alternator for wireless, and a starting magneto.

A concentric bevel reduction-gear which can be supplied in several ratios is another feature of this engine.

The bore and stroke are 130 mm. × 160 mm., the weight dry, but with all accessories, is 560 kg. (1,230 lbs.), the normal B.H.P. is 400 at 1,450 r.p.m. and the maximum output is 520 h.p. at 2,200 r.p.m.

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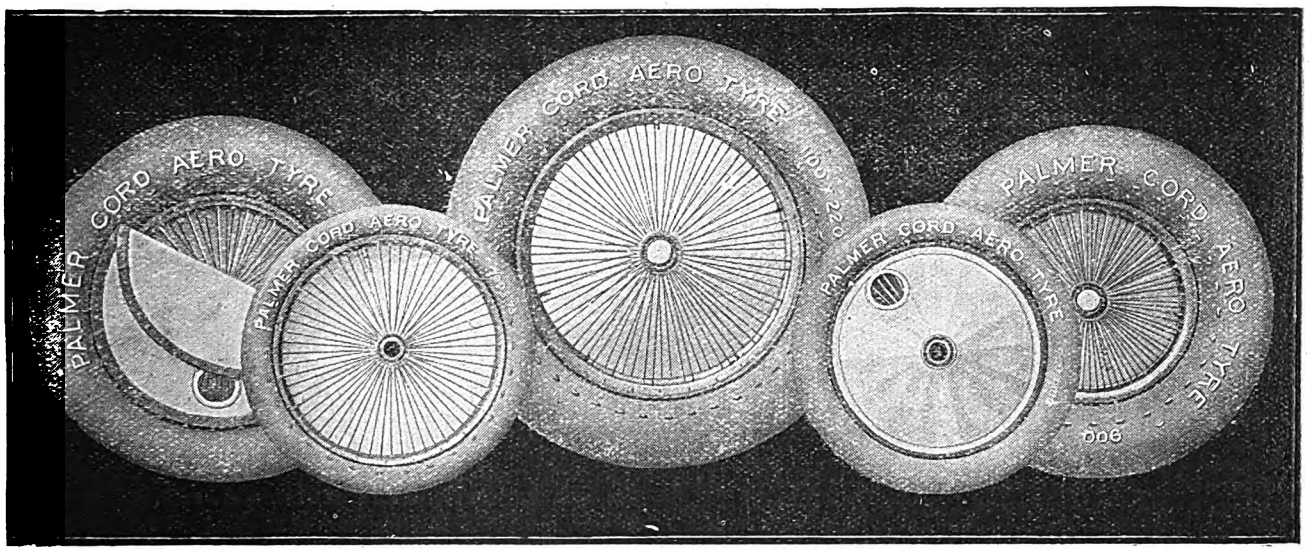
LANDING WHEELS & TYRES



STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
,,	138	130.	38.09	Central
575×60	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104 46
600×75	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
700×75	78	178.	44.45	132 46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132 46
,,	101	178.	31.75	132/46
700×100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
700×100	96	178.	55.	132/46
,,	99	178.	38.89	132 46
,,	112	150.	38.09	Central
650×125	119	178.	55.	132 46
750×125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	96	178.	55.	132/46
,,	99	178.	38.89	132 46
,,	112	150.	38.09	Central
800×150	82	185.	55.	135/50
,,	85	185.	55.	Central
,,	36*	185.	55.	135/50
,,	40*	185.	60.32	135/50
,,	152	185.	66.67	135/50
,,	163*	185.	66.67	135/50
1000×150	131	220.	66.67	Central
,,	102	185.	55.	125/60
,,	141	250.	80.	Central
,,	201	185.	60.32	125/60
1000×150	209	185.	55.	Central
,,	210	185.	60.32	Central
1000×180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
900×200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	202	185.	60.32	Central
1100×220	134	220.	66.67	Central
,,	136	250.	80.	Central
1250×250	133	250.	80.	Central
,,	154	304.8	101.6	Central
1500×300	115	304.8	101.6	Central
,,	126	304.8	152.4	Central
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have proved to be unequalled in respect of reliability. This fact is undoubtedly due in part to the merits of the engines themselves and to the careful testing to which they are subjected before they are passed as "airworthy" and in part to the excellent system of inspection and overhaul which is maintained in this country by the combined efforts of British ground engineers and the Air Ministry.

In America there is no official supervision of aircraft for civilian purposes, and no regulations concerning the airworthiness of either engines or aeroplanes. But the United States Army and Navy Air Services are making a very great effort to improve the reliability and safety of their Service engines—particularly in the case of the Naval Air Service.

At the end of the war the official U.S. type-test called for 50 hours' endurance test in 10-hour runs, ordinary adjustments and replacements being permitted during the intervals. The Naval Bureau of Aeronautics however came to the conclusion that such a test was inadequate and that much longer tests were desirable.

As a first step an endurance test of 300 hours at only 60% of full power was specified. Quite a number of engines passed this test, and new specifications calling for 300 hours at full rated horse-power on standard aviation petrol were drawn up.

A standard Wright Hispano-Suiza type engine of the E.2 model, equivalent to the 180 h.p. Hispano-Suiza in all main dimensions, was submitted for such a test some time ago. This engine ran very well indeed for 125 hours, but at the end of that period the valves, valve-seats and pistons were in distinctly bad condition.

The Wright Corporation thereupon put in hand a pair of cylinder-blocks of a new design. This design was originally worked out for their 12-cylinder 600 h.p. T.2 type which is now undergoing extensive tests in flight.

The new cylinder-blocks were fitted to the crankcase, etc., of the original E.2 engine which gave up the tests at 125 hours, and this engine thereupon ran 300 hours at full throttle. This run was not a non-stop one. Tests of oil were made during the run, and one or two stops were made to change oil. Also the test-stand was in the open, and a few plugs gave trouble owing to this fact and were changed.

The engine developed an average of 205 B.H.P. during the whole run and was giving slightly more power at the end than at the beginning of the test.

The valves and pistons were in almost perfect condition on the conclusion of the test, and on dissembly the only damage discovered was a broken ball-bearing retainer ring and a broken crankcase stud. It should be noted however that except for the cylinders this same engine had already run over 250 hours at full throttle.

The new type of cylinder-block is now fitted as a standard to the Wright-Hispano type engines as well as to the new T.4 type engine.

The Wright Corporation believe that the new E.4 engine as it is called will prove to have an average service life between overhauls of something like six times that obtained with engines of older types.

At least one other American engine the Aeromarine U.873, has run a 300-hour type-test without serious trouble. It is not quite clear whether this was a full throttle-test or not.

The point however is that whereas in this country the official type-test calls for only 50 hours' running, America has decided that a much more severe test is desirable and can be fulfilled, and in adopting this more severe test it has set itself in the way to provide engines of a higher standard of reliability than can be certainly secured under present British regulations.

It is interesting to observe that this move has been initiated by the American Naval Air Service. There is not the least doubt that the necessity for engine reliability shows itself rather more acutely in the case of oversea operation than it does in ordinary overland flying, and it is to be noted that the American Bureau of Naval Aeronautics has shown signs that it is willing to some extent to accept engines of somewhat heavier build than are usually considered as desirable for Army Service, provided that a commensurate increase in reliability is obtained in return for the additional weight.

But in the case of the Wright E.4 engine a distinctly light engine has stood up to a surprisingly heavy test. The European Hispano of the same bore and stroke is rated at 180 h.p. at 1,800 r.p.m. The E.4 averaged 205 h.p. during 300 hours, on a dry weight of 480 lbs.—which is by no means heavy for a relatively low-powered engine.

It would appear that it is very distinctly up to the British engine makers and to the British Air Ministry to see that in this vital matter we are not left behind by America—as we have already been in respect to aeroplane performance. It is somewhat fashionable in this country to be sarcastic concerning American aircraft construction—and there is some ground for this attitude.

But after all despite their curious ways the American aeroplane and engine designers are getting results—which is the thing which matters most at the present stage.

NIGHT FLYING.

In an official report issued by the Air Ministry upon the results of the night-flying tests made on the London-Paris route during the early part of this year it is stated that night-flying in fair weather proved to be as simple as flying by day.

The only added difficulty of night-flying is alleged to be the fact that clouds cannot be seen and avoided in the dark, and for night-flying machines must be equipped with some form of automatic control or of true horizontal indicator on this account.

The experiments as to lighting of the route in bad weather gave interesting results. The Strontium (red) light at Croydon gave very good results in bad weather. Pyrotechnic signals are much more effective at night as might be expected.

Mist-piercing flares gave satisfactory results, but are so excessively costly that they can only be used in special emergencies.

THE FIRST POST-WAR HUNGARIAN AEROPLANE.

The machine shown in the photograph was designed and constructed by Messrs. Szebeny and Oravecz of Budapest. It is intended for school work.

The machine is a wood-built side-by-side two-seater fitted at present with a 100 h.p. Mercédès engine, which is later to be replaced by a home-built engine.

The main particulars are:—Span, 11.4 m. (37 ft. 4 in.); height overall, 2.3 m. (7 ft. 6 in.); weight, empty, 580 kg. (1,276 lbs.); weight, loaded, 800 kg. (1,760 lbs.); speed, 140 km.h. (87 m.p.h.); climb, 1,000 metres (3,280 ft.), 6½ minutes.

The Szebeny and Oravecz School monoplane (100 h.p. Mercédès). The first post-war Hungarian aeroplane.

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Vickers "Vanguard."

The above illustration shows a Vickers "Vanguard" (23 Passenger) Aeroplane fitted with two Napier "Lion" Engines.

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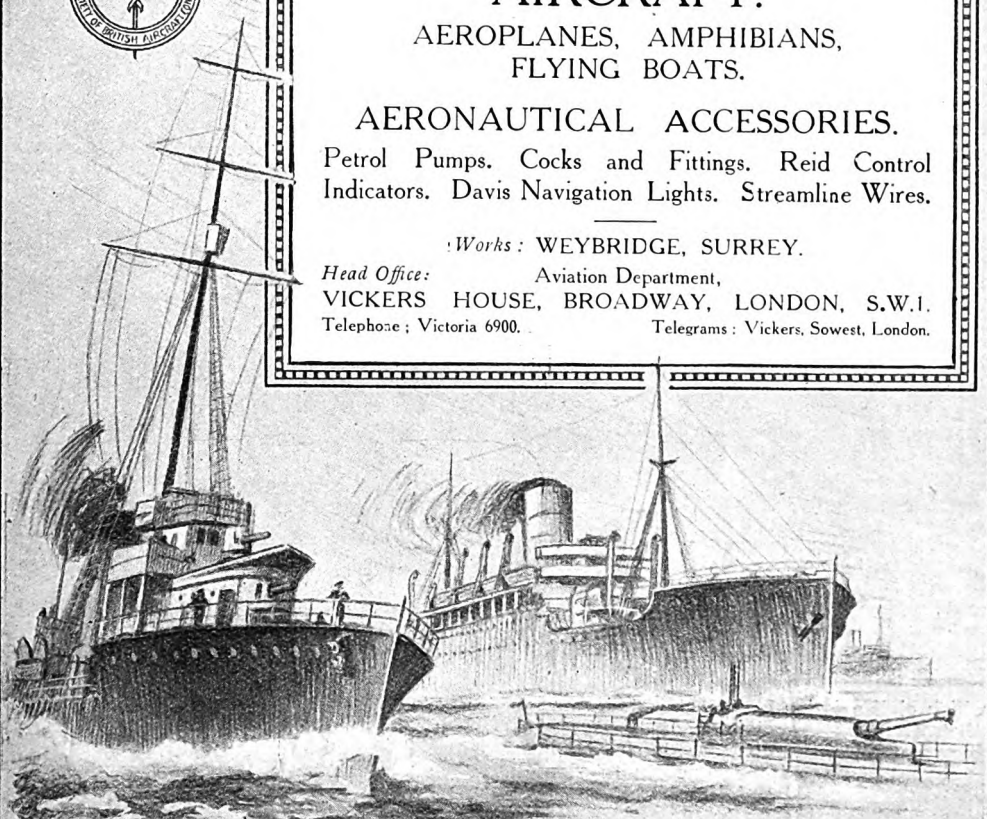

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FAIREY PROGRESS.

The Fairey Aviation Co. under the direction of Mr. C. R. Fairey continues to add to the reputation which it has already gained as one of the most progressive of aircraft manufacturers.

The well-known Series III type Faireys are still being ordered by the Air Ministry and are giving great satisfaction in service. The latest type IIID seaplanes at Malta have been looped, spun and rolled—and despite their very large useful load appear to like being treated as though they were scouts. These machines develop a speed of nearly 120 m.p.h.

The recently-produced "Flycatcher" has now passed its trials. It has a remarkably fine performance, and is particularly marked by its extraordinarily low landing speed and by its controllability at low speeds. The "Flycatcher" is now being constructed in an amphibian form.

The "Fawn," another undescribable machine built for the Air Ministry is under trial and is showing an equally satisfactory performance.

All the new Fairey types are now built upon the Fairey "unit" system, and embody the type of metal construction developed by the Fairey firm. Wings may be built either of steel or of wood to suit the customer's requirement.

The centre section unit is in all cases built as a steel tubular unit which ensures absolute interchangeability on the part of the attached wing, fuselage, or undercarriage units, and avoids the necessity for trueing up of this section of the machine.

Steel wings for the Standard Series III machines have now been made and tested in flight and can be built for all other types.

A very successful oleo-pneumatic undercarriage has been developed and is fitted to the Series III "Flycatcher" and "Fawn" types.

A good deal of experimental work on new seaplanes is in hand notably the construction of a large twin-float seaplane. This type has not yet received the attention which it deserves and the results of this particular experiment cannot fail to be both interesting and important.

In connection with seaplanes it is worthy of note that the Fairey firm have entirely abandoned the use of three-ply in the construction of floats in favour of diagonal mahogany planking.

The firm intend to continue experimental work in connection with low-speed flying, particularly in regard to control in the stalled condition. The results which they have already obtained in this direction are of the greatest importance, and their further development will add greatly to utility of aircraft for all purposes.

THE AIR MINISTRY AND INTERNATIONAL AIR RACES.

The Air Ministry announces that with a view to encouraging the entry by British aircraft constructors of British racing aircraft in international air races the Air Council have undertaken in this and future years until further notice, to purchase for a sum not exceeding £3,000 in each case, the winning aircraft (without engine) in both the Aerial Derby and the Schneider cup races, provided that the aircraft is in each case British designed, built, and owned, and is not of a type which has previously won either race.

The Council consider that the production of aircraft capable of winning these events represents a definite advance in design, and official experiments will be undertaken after the purchase so that the full research and military value of the machine may be obtained.

[This is at any rate a step in a useful direction. The American method of actually ordering Service machines to be built for the great international races is perhaps preferable. But better still is the principle of entering Service machines to compete in the races without allowing them to win the prizes.—C. G. G.]

ROLLS-ROYCE REVOLUTION RECORDS.

The extent to which civil aviation has developed since 1919 is seen by fact that, from an investigation of the records kept of the running of engines, "Rolls-Royce" aero engines have completed 1,123,243 (one million one hundred and twenty-three thousand two hundred and forty-three) miles in the air exclusively in civil aviation up to the end of 1922. That stupendous mileage is subject to a substantial addition for the first six months of the current year, the precise figures for which are not yet available.

In revolutions it works out at roughly 1,700,000,000 turns of the crank-shafts or approximately one revolution for each pound sterling which is owed to us by our gallant Allies in the recent tribe-fight.

THE LATEST FROM NEWFOUNDLAND.

Mr. Sidney Cotton, of the Aerial Survey Co. (Newfoundland) Ltd., writing from the Aerial Survey Company of St. John's, Newfoundland, on Feb. 26, says that the day he arrived at Hawkes Bay (where the firm's timber property is situated) the temperature was 26 degrees below zero at one o'clock. After that the old Martinsyde was tied down in the open for a fortnight with the temperature down to 40 degrees below zero yet she always started the first time and gave no trouble whatever. On the coldest day the engine started first time and a perfectly satisfactory test flight was made. These are the coldest temperatures the firm has yet experienced and as it never gets any colder than this Mr. Cotton does not think that they need fear trouble from cold.

The "Quest Baby" for the seal fishing expeditions duly arrived and the firm had a busy week getting it ready and building the platforms on the ships from which she was to operate. She was to be dropped onto the ice or water and take off from there.

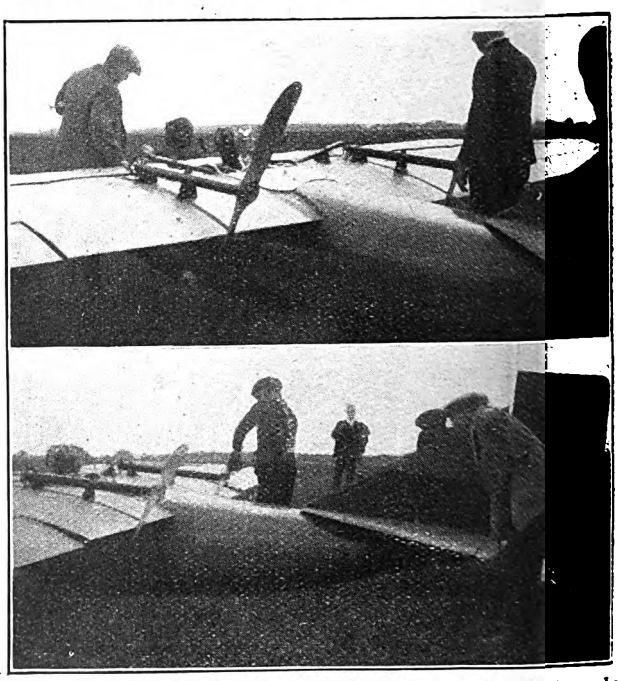
Mr. Cotton was to leave about the third week in March for Stag Bay in Labrador but actually left early in April. He took with him several surveyors and a complete photographic outfit, as that part of the country has never been surveyed or photographed and a map of the area may bring in a considerable sum of money to the person who can have it in St. John's before the end of April.

The Aerial Survey Co. are the only concern who can do this as it is absolutely impossible to cross to Labrador during the Winter months by any other means than aeroplane. Mr. Cotton's intention was to fly up to Stag Bay and make an aerial map of the rivers as well as taking a large number of oblique photographs to get the topographical nature of the country. At the same time he would be able to ascertain definitely whether there is any gold there or not. If there is gold there the firm would be able to get suitable remuneration for their map. If there is no gold there they would be the only people to know it.

As no one can get to Stag Bay by ordinary methods of transport until early June they would have plenty of time to work. The flight to the Labrador was probably carried out with one Martinsyde and two Westlands, carrying a party of two surveyors, W. D. Corse (Aerial Photographer), Major Kitchener (Pilot), Mr. Breakell (Pilot), J. Stannard and Godfrey (Mechanics), and Mr. Cotton himself on the Martinsyde. Both Westlands are fitted up for photographic work and as all supplies of petrol and oil were distributed before the ice came down there is no reason why they should not attain their object.

ANOTHER FED AIR-WRITER.

The following paragraph is from the American magazine "The Ace" of Los Angeles, California:—"Eil Budwig recently attempted to duplicate Capt. Leslie Tait-Cox's aerial penmanship by writing 'Hello' in the sky over Los Angeles. He was doing well but ran out of smoke and could not complete the last letter. It certainly was . . ."



THE "GNOSSPELICOPTER."—These two photographs show very clearly the arrangement of the engine and the chain-drive to the twin airscrews.

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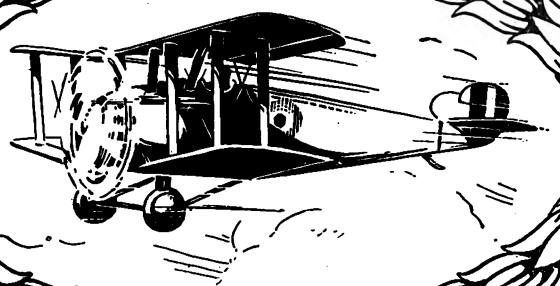
HAWKER



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AVIATION IN SOUTH AMERICA.—*Continued.*

BY GEORGE FREDERICK LUKE, F.R.G.S.

BRAZIL.

Brazil, which is the largest of the South American Republics, has a population of over 30 millions and an area of 3,291,416 sq. miles, and is the fourth largest country in the world. Brazil has had a close connection with Aviation since its earliest inception, for on Nov. 12, 1906, Santos Dumont, in France, astonished the world by making what was then an unparalleled duration record of 21 seconds. That was only 16 years ago. To-day Brazil has a well-trained Naval and Military Air Force, each operated separately, amounting to some 10 squadrons in all, the Naval side being trained by the Americans and the Military by the French. Naturally, the machines in use are either American or French, the Navy having mainly Curtiss flying boats and the Army, Hanriot, Spad, Farman, Morane Saulnier, and some obsolete Nieuports and Caudrons. There are Naval Schools at Rio de Janeiro and Porto Alegre, and a military school at Sao Paulo, and others are to be established as soon as the finances of the country permit.

Of Commercial Services there are actually none, but two semi-commercial routes are projected from Rio to Porto Alegre, the one along the coast touching at Santos, Paranaqua and S. Miguel, and the inland one calling at Sao Paulo, Curitiba and Camizas. These services at the present are intended primarily for use of the Naval and Military Forces, and will be organised and controlled by the Ministry of Marine and Ministry of War, respectively, but the facilities they afford will be available for Civil and Postal purposes. The Government is authorised to borrow up to 4,000 contos of milreis or £200,000 to cover the cost of the two schemes.

A passenger and freight service between Porto Alegre and Montevideo, Uruguay, serving various centres between these two ports, was projected by a Senor Abreu Soares, and he endeavoured to form a company for this purpose, but financial support was lacking, so the project fell through.

The prospects for running aeroplane or flying-boat services for mail and passenger traffic are fairly good, inasmuch as there is extensive territory not served by railroads, and the coastal boat service between the smaller ports is uncomfortable and irregular, but drawbacks would be found in the difficulty of transporting material and petrol to outlying aerodromes, and in the unsuitability of the ground traversed for forced landings.

The only Foreign Missions are those already mentioned, i.e., the United States Mission for training the Navy and Naval Air Service, and the French Mission for training the Army and Military Air Service. During the Centenary Celebrations Capt. René Fonck and Lieut. Fronval came out to Rio on a special mission of aeronautical propaganda, chiefly in the interest of the French Aircraft Constructors. They had with them four aeroplanes, two of a commercial type, Bréguets, and two fast Spads. I witnessed one of the finest exhibitions of aerobatic flying I have ever seen, and was only one of 200,000 people that saw it. Thus do the French Government help their Aircraft Industry.

Joy-riding is carried on to a small extent by Orten Hoover, an American, at Rio, and Mlle. Boland, of trans-Andes fame, runs a ferry service from Rio across the Bay to Nichteroy, a distance of 6½ miles.

Apart from the Military School of Guapira already mentioned, there are four other civil schools in the Sao Paulo district which train pilots for the Army under contract from the Ministry of War. They are :—

Escola da Forca Publica, using Curtiss Oriole machines.

Escola Campineira, using Caudron machines.

Escola Curtiss (run by Orten Hoover), using Curtiss machines.

Escola Brasil, using Aviatic machines.

The foregoing represents the extent of aerial activities in Brazil as they are to-day, and it seems to me lamentable that Britain, who led the world in Aviation during the War, should have no place in the training of, or in the supply of material to, Brazil, which undoubtedly will be in a very few years the greatest, richest and most powerful of all the South American Republics.

CHILI.

Chili, with an area of 307,774 square miles and a population of some 4,500,000, has the distinction of having the only Air Force in South America which can be said to be modelled solely on British lines, and using only British material.

The Naval Service, whose temporary bases are at Valparaiso and Quinteros, has been trained under Lt.-Col. J. L. Travers, late R.A.F., with two British mechanics. The material consists of three Avros, four Shorts and two Sopwith Seaplanes, also two Supermarine Flying Boats Channel Type Mark II fitted with Siddeley "Puma" engine.

The Military Service has its headquarters at the aerodrome "Lo Espejo," near Santiago, and the Military Aviation School is at "El Bosque," which is next to "Lo Espejo." The school is housed in a fine large building, and is well equipped to teach the latest improvements invented for safe flying, as well as the usual military routine, including directional wireless and wireless telephony.

On the aerodrome are hangars built of reinforced concrete capable of holding 10 or 12 machines of the Avro or Bristol type, and there is also an observatory and meteorological office.

The material consists of ten Avros, eight S.E.5as, eight Bristol Monoplanes and 20 D.H.9s fitted with Siddeley "Pumas." They also have two Italian S.V.As., which, I understand, were gifted to the nation by Italians resident in the country. There is also a well-equipped repair shop employing some 25 mechanics.

All the afore-mentioned British machines were presented to Chili by Great Britain in part payment for the use during the War of the Chilian battleship *Latorre*, named by us during the War the *Canada*.

The very highest credit is due to Major Scott, late R.A.F., head of the British Mission to Chile 1920/21, who created and organised throughout the Chilian Military Air Service, and this in spite of all kinds of political and diplomatic intrigue that was endeavouring to hinder the realisation of his task.

With 13 Avros Major Scott trained 74 pilots and handed back 13 Avros intact at the end of his contract. This, I think, is a wonderful performance, and one worthy of the highest traditions of the R.A.F.

The most outstanding flight made by a Chilian aviator was that of Capt. Aracena, the present Director of Aviation, who, accompanied by a British mechanic, flew on a D.H.9 with "Puma" engine from Santiago to Rio de Janeiro, via Mendoza, Buenos Aires, Montevideo, Porto Alegre, etc., a distance of some 1,850 miles. This was in the Spring (our Autumn) of 1922.

As regards Commercial Aviation, this does not exist at present. The principal difficulty in the way of establishing air routes in Chili is its configuration, which renders forced landings extremely hazardous, and might exclude the use of the aeroplane except for the Valparaiso-Santiago route.

A service between Valdivia on the 40th degree of latitude to Iquique on the 20th, which calls at Talcahuano, Valparaiso, Coquimbo and Antofagasta, has been mooted by people representing British and French interests using flying boats. The difficulty, however, is that, with the exception of Valparaiso and Talcahuano, the ports mentioned have no harbours, and the almost perpetual heavy swell experienced along the West Coast would make the landing at different ports somewhat perilous.

Such a service, however, if it could be worked, would be an inestimable boon to the trade of the country, as at the present time the communications for mail and passengers are slow and erratic.

PERU.

Peru, which has an area of 439,014 sq. miles and an estimated population of 5,000,000, possesses the nucleus of an efficient Air Force, under Commandante Juan Leguia, son of the President, who served with the British in the 7th squadron R.N.A.S. during the Great War and won the D.F.C. The Naval Service has been trained by Capt. W. Simon of the U.S. Navy and use mainly Curtiss Flying Boats.

The Military Service under the control of Commandante O'Connor, a Peruvian of Irish descent, use British, French and Italian machines. It is not so efficient as the Naval side, but in the Summer of last year Commandante Leguia visited this country and made considerable purchases of material, securing also the services of Major Marsden, late R.A.F., to act as Chief Instructor, so that in the near future this service should become quite useful.

In 1919 the French sent out a Mission, but in January, 1920, the Head of this crashed and was killed, and this took away a great deal from their prestige. The Italian firm of Ansaldo had a Mission here, and succeeded in getting two of their machines purchased by public subscription and presented to the Nation.

The principal aerodromes are at Lima and Arequipa, and the repair shops are also in charge of a British subject, Mr. Thurmer.

From the foregoing it will be seen that we have succeeded in ousting both the French and Italians, and have now got complete control of the Military Wing.

Turning now to Civil Aviation, there is one Commercial Aviation company, the Compania Nacional Aeronautica, Lima, which was formed in July, 1920, with American capital, and they are agents of the Curtiss Co. They started a service between Callao and Lima, but this had to be abandoned owing to lack of support, the reason being that there is an excellent tramway service between the two towns taking only 25 minutes.

A mail service along the coast has been mooted, but nothing

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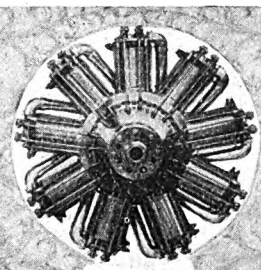
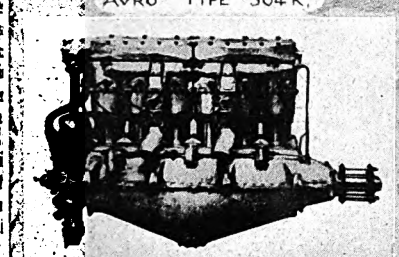
BRITISH A D C LIMITED AIRCRAFT

A SELECTION FROM OUR STOCK.

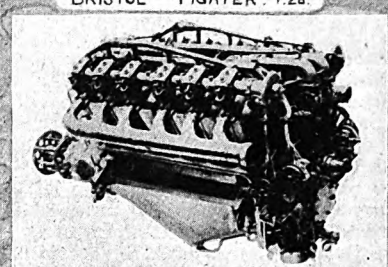
AVRO TYPE 504 K.


200 h.p. B.R.2

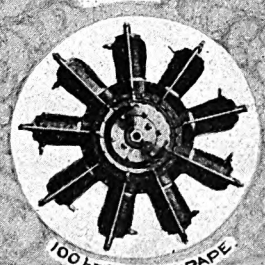
BRISTOL FIGHTER. F.2B.

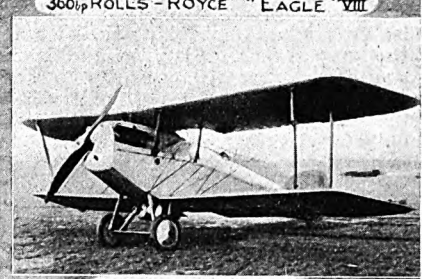

230 h.p. SIDDELEY "PUMA".

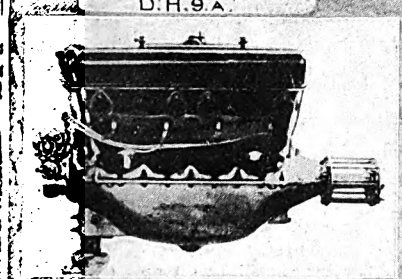
D. H. 9.

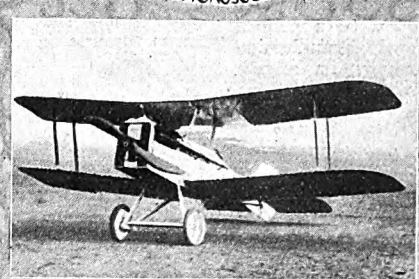

360 h.p. ROLLS-ROYCE "EAGLE" VIII

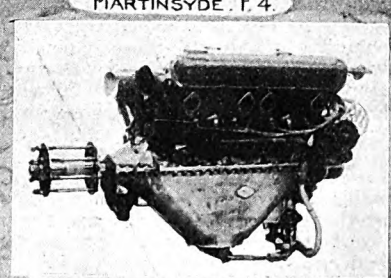
D.H.9.A.

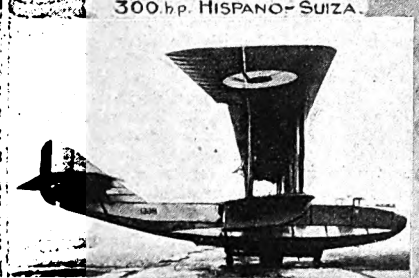

100 h.p. MONOSOUPAPE

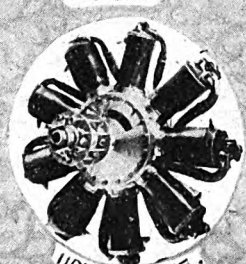

MARTINSYDE. F.4.

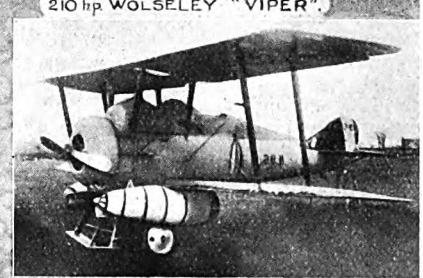

300 h.p. HISPANO-SUIZA.


S.E.5.A.


210 h.p. WOLSELEY "VIPER".


F.3. FLYING BOAT.


110 h.p. LE RHONE.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has so far materialised, owing to lack of capital, and also on account of the heavy Pacific swell, making landing difficult.

In considering possible air routes, apart from the coastal one, the most important that immediately strikes one is that of linking up the Pacific with the inland port of Iquitos, 2,175 miles up the Amazon from the Atlantic coast and 630 from the Pacific.

In 1918 Squadron-Commander Dyott, R.N.A.S., made the extremely hazardous journey from Pacasmayo to Iquitos to make an air-route reconnaissance of the country from the coast to the latter town. The four possible routes were as follows :—

1. The Pichis trail from Lima via Oroya and thence to Iquitos.—Flying distance, 750 miles; present time, 32 days; flying time, 9½ hours.

2. Trujillo via Soledad and Parcoy, thence by the Huallaga River to Iquitos.—Flying distance, 590 miles; present time, 40 days; flying time, 7½ hours.

3. Pacasmayo, Chachapoyas, Balza Puerto and the Huallaga River to Iquitos.—Flying distance, 690 miles; present time, 64 days; flying time 8½ hours.

4. Paita or Chiclayo to Bellavista, thence through the Pongo de Manseriche to Iquitos.—Flying distance, 630 miles; present time, 92 days; flying time, 8 hours.

Of these the fourth would appear the easiest on account of the lower height of the Andes, at this point some 8,000 ft., and the possibility of utilising the Rio Marañon for alighting in case of necessity.

In the latter part of last year an American aviator named Faussett practically accomplished this flight, using route No. 4 as suggested by Dyott. He left Chiclayo and flew 436 miles non-stop to within 60 miles of his destination, being forced to land in a violent storm at the point where the Rio Tigre joins the Marañon. He accomplished this remarkable flight on a Curtiss-Oriole with an 80-h.p. Curtiss engine, taking only six hours.

The difficulty in establishing such a route would, of course, be the groundwork. Supplies and landing-places, whether on land or water, would require to be established about every 200 miles, those on the east of the Andes being supplied from the Atlantic coast, and those on the west from the Pacific. Amphibian machines would be required, and the capital necessary about £250,000, as against £9,000,000 for building a railway.

The benefits of such a service are obvious, as it would bring this important area within 12 hours of the Pacific coast instead of 32 days as at present.

COLOMBIA.

Naval or Military Aviation cannot be said to exist as yet, the activities in this connection being confined to a school for training pilots with French machines and French instructors. The lack of the third arm, however, is amply counterbalanced by the wonderful progress that has been made in Commercial Aviation, both for the carrying of mails and passengers.

No other country in South America, and few in Europe, possesses such a complete system of air mails as does Colombia, and this is mainly due to the lack of competition from other means of transport and the eminent suitability of the configuration of the country for aerial communication. The advent of the aeroplane and flying boat has been instrumental in solving a problem which seems almost insoluble by other means.

Before aerial transport was established the sole artery of communication with the interior was the Magdalena River which is navigable for some 600 miles as far as La Dorada. The shifting sands and shallow draft, however, made the duration of such a journey a matter of conjecture, and mail matter from this country often took as much as five or six weeks to get to the Capital, Santa Fé de Bogotá. With the introduction of the Air Mail a letter takes less than three weeks, so that it is possible to get a reply to a letter in the same time that it previously took that letter to arrive at its destination.

The mail services are as follows :—

Barranquilla to Girardot.—This is a bi-weekly service leaving Barranquilla every Tuesday and Friday and arriving at Girardot the same day, a distance of some 350 miles, with stops at Monpox, Barranca, Bermeja, Puerto Berrio and Honda for the delivery of mail. From Puerto Berrio, the port on the Magdalena for Medellin, the mail is taken by special messenger to the latter town, and the same is the case at Honda to Manizales, and at Girardot for Ibagué, Bogotá and Tunja.

Mail forwarded by air arrives at Medellin, Ibagué and Bogotá on Wednesdays and Saturdays, and at Manizales, Neiva and Tunja on Thursdays and Sundays. Letters addressed to other cities in the interior of the Republic are landed at the river port nearest to the National Post Office of the district in which the town is situated.

Girardot—Barranquilla.—This service is the same as the foregoing, only reversed, the departure being on Wednesdays and Saturdays. The Wednesday service makes connection with the Clyde Line steamers sailing on Fridays from Puerto Colombia to New York. Mail from Bogotá to New York takes 14 days. It also connects with Elders and Fyffes' steamers leaving on Thursdays and Saturdays from Santa Maria for Bristol, mail taking by this route 20 days from Bogotá to London.

Barranquilla and Cartagena.—This service flies every Monday, returning to Barranquilla the same day in time to make connection with the Tuesday Barranquilla and Girardot service.

Barranquilla and Santa Maria.—This service is the link between the Barranquilla and Girardot line and Elders and Fyffes' steamers. The aeroplanes leave Barranquilla every Thursday and return the same day to connect up with the Friday Barranquilla and Girardot service.

These are all the services, actually working at the moment, but they represent some 1,250 miles, which makes our London-Paris seem rather a weak effort in comparison.

[But when the Berlin and Cologne services are added the comparison is quite favourable.—Ed.]

The charges for mail are rather high, being 1s. 2½d. per ½ oz., but the saving in time is enormous. The unfortunate part of all these services is that they are run by a German company.

The Colombian-German Aerial Transport Co. has a contract with the Government to carry the mails for five years, being subsidised to the extent of $100 or £20 per trip from Barranquilla to ports on the Magdalena River. During the three months ending October this company made 307 flights, totalling 57,640 kilometres, carrying 303 passengers and 29,280 kilos of mails and freight. All the machines used are German, Junkers' monoplanes. For a country with only five millions of population this is a wonderful record.

In conclusion, I would say that great opportunities await the Aircraft Constructor, the Pilot and the Capitalist in South America. The continent is developing fast, and the means of transport essential to that development are slow. The people, unhandicapped by tradition, take to Aviation with probably better grace than did our forefathers to the Railway. The meteorological conditions are far better than those found in Europe.

With a return of general trade to something like its pre-War prosperity, South America should prove a large and steadily increasing buyer of aircraft, but it will want the very latest in design and construction, not surplus War stock.

AIRCRAFT IN PARLIAMENT.

In the House of Commons on May 30, in a written answer to a question by CAPT. WEDGWOOD BENN, MR. GWYNNE on behalf of the PRIME MINISTER replied that the Government had decided that the amalgation of the common Services of the three Fighting Departments is not advisable. He added that the Weir Report had recommended that (1) a Joint Committee should be established to discuss matters affecting the Medical Services of the four Departments (including the Ministry of Pensions). This Committee to advise on construction of new hospitals, training, supply, the use of Service Hospitals for the accommodation of disabled war pensioners and all economies to be effected by co-operation. (2) A Joint Committee should be set up to discuss economy in Chaplains' Services. (3) Existing educational facilities to be used as far as possible and a Joint Committee of the educational branches of the Services and a representative of the Board of Education should be set up. (4) An Inter-Departmental Committee representing all the Departments of State concerned with Intelligence should be set up. (5) Five technical Committees should be appointed to deal with Supplies, particularly with regard to the adoption of standardisation of stores in use by the three Services. (6) The absorption of Air Force mechanical transport into the Army mechanical transport service is inadvisable. A Committee should be set up to arrange for inter-Service transport co-operation in certain stations (7) A Committee should be set up to ensure close and constant co-operation between the various Works Branches to ensure uniformity in respect of contracts, etc., and that the technical resources of each branch are available for use of the other branches. (9) To ensure that the proper functioning of the various Committees are fully and effectively used should be regarded as the special responsibility of the heads of the branches concerned. Each Committee should furnish an annual report upon its work.

PERSONAL NOTICES.

DEATH.

BARRINGTON FOOTE.—On May 27, at Thorpe Lee House, Egham, after a long illness, Maj. Alan Wortley Barrington Foote, late 11th Hussars and R.A.F., husband of Ethel Barrington Foote, eldest son of the late Colonel and Mrs. Barrington Foote, Purton, Wilts, aged 38

BIRTHS.

LEE.—On May 29, at Ruskin Road, Crewe, Cheshire, to Gwyneth, wife of F/Lt. A. S. G. Lee, M.C., R.A.F.—a daughter.

SCOTT.—On May 29, at Pulham Airship Station, Norfolk, the wife of Maj. G. H. Scott—a daughter.

ENGAGEMENT.

BETTINGTON—MITFORD.—The marriage of Egerton Mitford Bettington, S/Ldr., R.A.F (retired), son of Col. and Mrs. Bettington, of Johannesburg, and of Beverley, East Yorkshire, and Cicely, youngest daughter of the Rev. Edward Mitford, lately vicar of Hunmanby, East Yorkshire, and of Mrs. Mitford, will be solemnised in Holy Trinity Church, Folkestone, on June 16, at 2 p.m.

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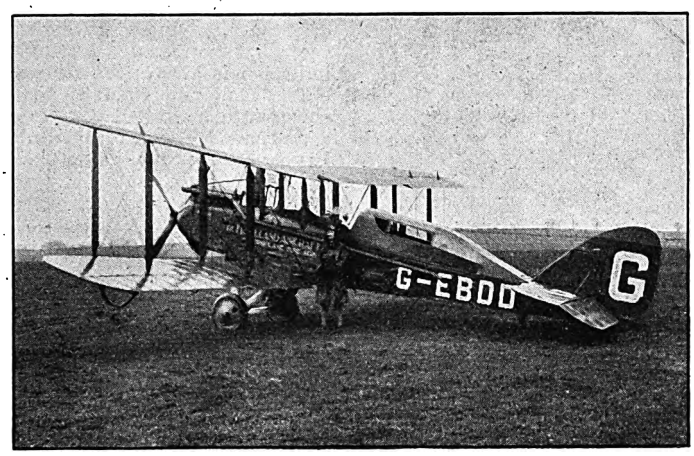
DE HAVILLAND AEROPLANES.



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AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 17; Tuesday, 10 Wednesday, 16; Thursday, 17; Friday, 20; Saturday, 21, Sunday, 2.

LONDON—PARIS :

Handley Page Transport, Ltd., machines 22*, passengers 134, freight 5,057 lbs.; Air Union, machines 15†, passengers 9, freight 24,881 lbs.; Total machines 37, passengers 143.

LONDON—BRUSSELS—COLOGNE :

Instone Air Line, Ltd., machines 24*, passengers 75, freight —.

MANCHESTER—LONDON—AMSTERDAM—BERLIN :

Daimler Airway, machines 28, passengers 57, freight —.

LONDON—ROTTERDAM :

K.L.M., machines 13, passengers 9, freight —.

SPECIAL MACHINES :

De Havilland Hire Service, machines 1, passengers 1.

Total number of trips by British machines : 75, carrying 267 pas. Foreign machines : 28, carrying 18 pas.

STATISTICS.

For week ending June 3 :—

Machines, 103; Passengers, 285; Crews, 168; Total Personnel, 453.

Corresponding week last year :—

Machines, 150; Passengers, 339; Crews, 207; Total Personnel, 546.

Corresponding week, 1921 :—

Machines, 85; Passengers, 339; Crews, 101; Total Personnel, 440.

Corresponding week, 1920 :—

Machines, 89; Passengers, 126; Crews, 100; Personnel, 226.

* These machines also carry loads of freight.

† Some machines are freighters only

Croydon Notes.

At Croydon it is rumoured on the most hopeful authority that the multitudinous uniforms of the quondam German Emperor have been purchased for the daily and personal use of the Directors of the new, if ever, Million Pound Monopoly Company. It is moreover understood that the said directors may lift up their eyes to High Holborn for guidance in time of trouble.

The A.D.C. are increasing their design staff and can do with some more draughtsmen. Mr. Chatsworthy, late of Yeovil, is in charge of the drawing office and wants energetic hardworking assistants as happily the firm finds itself with plenty to do. Draughtsmen who are on the look-out for jobs should write to the Aircraft Disposal Co. at Waddon.

One gathers than an official edict has been issued by the management of one of the cross-Channel air lines that its pilots are not to compete in the King's Cup or any other race. Doubtless when one has got good pilots it is best to preserve them, but it is rather rough on the pilots. Also it seems a trifle disrespectful towards the King even in these socialistic days.

Owing to the bad weather the number of passengers has dropped and for the time of year the numbers are the lowest since 1920.

The weather was responsible for the Daimler Monday service to Berlin being postponed until Thursday. Mr. Robertson on that day took G-EBBS through. He returned the following day making Croydon at 18.57 hrs.

Mr. Walters, the new Handley Page pilot, has been over to Paris several times as spare pilot learning the manners and customs of the route One gathers that the Powers-That-Be have a high opinion of his ability as a pilot.

Handley Page Transport suffered what is now for them a very rare occurrence on Sunday. G-EBBG which started for Paris with nine passengers had to return with engine-trouble. Mr. Dismore who was coming in on G-EAPJ with ten passengers from Paris was informed of this by wireless. He thereupon hustled "PJ" which got in at 13.39 hrs. and at 14.18 hrs. with Mr. MacIntosh as pilot she was off again with "Beer George's" passengers.

[This one may explain is only "signalese" for BG, and not a vulgar nickname for a pilot.—Ed.]

Mr. Hinchliffe returned from Amsterdam on Friday on G-EBCX and waxed merry on arrival, making the "34" sit up and do good and sharp turns

The old "City of London" "Vimy" is to take her place on the Instone Service again shortly. With the old type wings on again and after a thorough overhaul the performance of the veteran, who is now in her fourth year, is excellent. It is said that her speed is equal to the W8bs. The Instone Line will also be operating the "Vulcan" G-EBBL again shortly.

The Surrey Flying Services have now engaged Mr. Rhind as pilot and on Friday evening he was doing his official tests for his B licence observed by Mr. Baker. All his landings were excellent and looked as though he was in the habit of using a field about the size of a tennis-court for an aerodrome.

Mr. Broad on a D H.9 of the De Havilland Hire Service passed through the aerodrome on Saturday bound for Paris

Incidentally another petrol firm has now emulated Mr. Shaw's example and has put up a lamp-post outside their office. One suggests now that Mr. Shaw should put up one of those revolving globe signs and give wireless concerts and see what happens. Anyway he says that he realises that imitation is always the sincerest form of flattery.

The Hall and Brenard syndicate have now formed themselves into a limited company with registered offices on the aerodrome. They are now full up with orders and extremely busy. Everyone will wish "Potash and Perlmutter" the best success.—G. D.

Manchester.

Bad weather has been responsible for the recent quiet state of the Manchester Aviation Company. During Whitsun week Mr. Dickinson visited the Isle of Man to select landing grounds.

The past week has been devoted to the Ancient Order of Buffalos who have sold numerous tickets to their members. A percentage of the takings from these goes to the "Old Buffers." They have also indulged in a height guessing competition which thoroughly intrigued them.

Mr. Dickinson is doing photography at Leeds this week and Mr. Newnham is on a similar job of work at Glasgow.

Mr. Summerfield, another comparatively old pilot, has been joyriding at Radcliffe.

Mr. Calvert, for so long with A. T. and T. and lately with the Daimler Airway, has joined the Manchester Aviation Company as ground engineer in charge of machines and Mr. Ritchie, late of the Surrey Flying Services, has also joined the firm.

The firm now requires a good fitter with experience of Siddeley "Pumas" and Le Rhônes and then the ground staff will be complete.

ANOTHER VIEW ON THE MILLION POUND MONOPOLY.

Among the earliest air-line pilots in this or any other country is Mr. H. Shaw, more usually known as Jerry Shaw, who now has charge of "Shell" petrol interests at the Croydon Aerodrome. Mr. Shaw was one of the first pilots for Air Transport and Travel Ltd. and his experiences on the London-Paris route when there was no organisation of any sort (Heaven knows there is little enough now) would make good reading if they could be set down as he tells them. His story of how he alighted in the Channel with a D.H.9 one Winter evening and on looking round found his American passenger standing on the back seat clad in undervest and pants, and a bowler hat, would alone make the name of the book.

He is still one of the steadiest and soundest of our pilots though he now has the responsibilities of a big business on his shoulders, and one would rather trust oneself to his judgment in the air than to that of any but a very few aviators. Therefore his views, influenced as they are by the longest possible experience as a pilot and as a close observer of air-line operation are well worth having. Mr. Shaw says :—

"A perusal of the latest report of the Civil Air Transport Subsidies Committee very forcibly brings home the fact, that during two years of subsidised cross-Channel services, we have made not one scrap of headway in the direction of putting Civil Aviation on its feet.

"We have dragged along from point to point like a sick child, given just enough by our Government, from time to time, to prevent the child from starving, but there has been no real progress. The method of treatment has been wrong for these sops have not made the child healthy.

"An entirely new treatment is now proposed which will necessitate the child exercising itself and should lead to success in the hands of the right people.

"With the past 'temporary,' 'revised' and 'permanent' subsidies there has been no incentive to make Air Transport

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pay its own way, and with the three separate managements and staffs, doing what one should do, no possibility of making it pay.

"Again, let me say, we are now, no further advanced than the day when A. T. and T. Ltd. ceased to operate. This, after the expenditure of hundreds of thousands of pounds, means that something is radically wrong with the present method.

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Readers of THE AEROPLANE who are interested in the above announcements are invited to communicate with the Editor at 175, Piccadilly, W.1.

RENDER UNTO CAESAR.

Last week Major Wilfred T. Blake who it will be remembered travelled recently to India in a D.H.9 piloted by Mr. Norman MacMillan in an abortive attempt to fly round the world sued the Aircraft Disposal Company for non-delivery of an F3 flying boat. The case was heard in the High Court before Mr. Justice Rowlatt. Major Blake described himself as the leader of the expedition, presumably after the manner of the Duke of Plazatoro in that he led the party from a seat behind the pilot.

The defence was that the machines were supplied at a ridiculously low charge for the purpose of a flight round the World. As Major Blake did not fly round the World, the A.D.C. were not bound to supply the boat.

For the defence Mr. Neilson asked Major Blake whether he said "When we get home, I do not say if we get home because I say we are going to get home." Major Blake replied "Surely you are not going to bring a remark made after a public luncheon?" One does not quite see the point of the question because Major Blake has carried out his promise all right though not exactly as intended.

His Lordship gave judgment for the plaintiff with costs. One understands that consequently the F3 is at Aintree awaiting instant removal by Major Blake. Incidentally one learned for the first time from this case that Major Blake's second name is Theodore, which being interpreted means "The Gift of God."—G. D.

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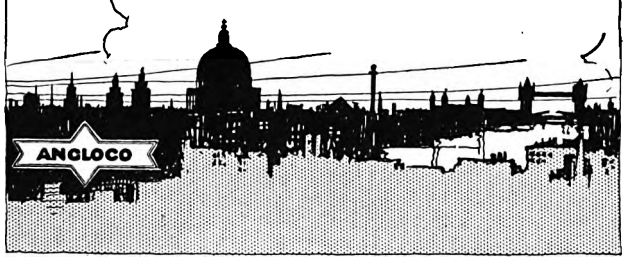

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THE AEROPLANE

Edited by C.G. Grey

WEDNESDAY, JUNE 13, 1923.

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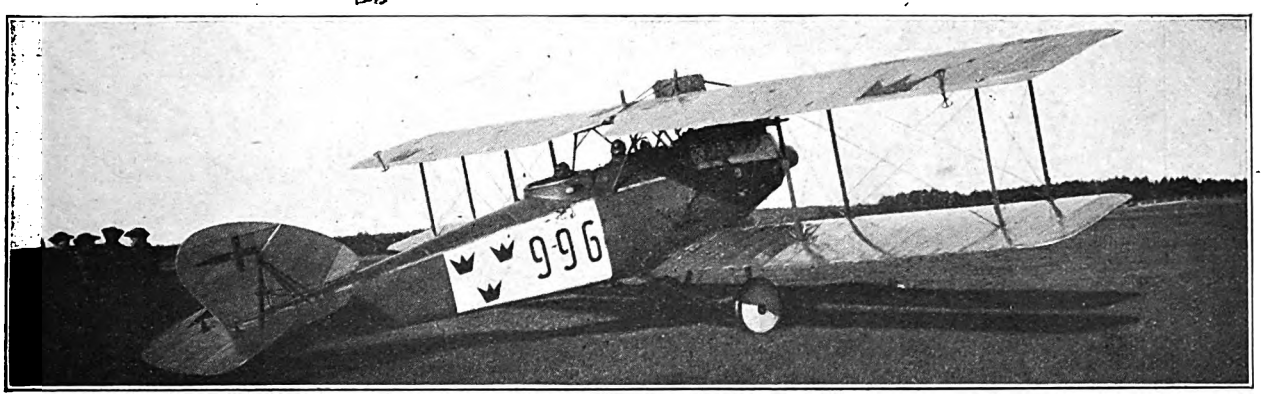

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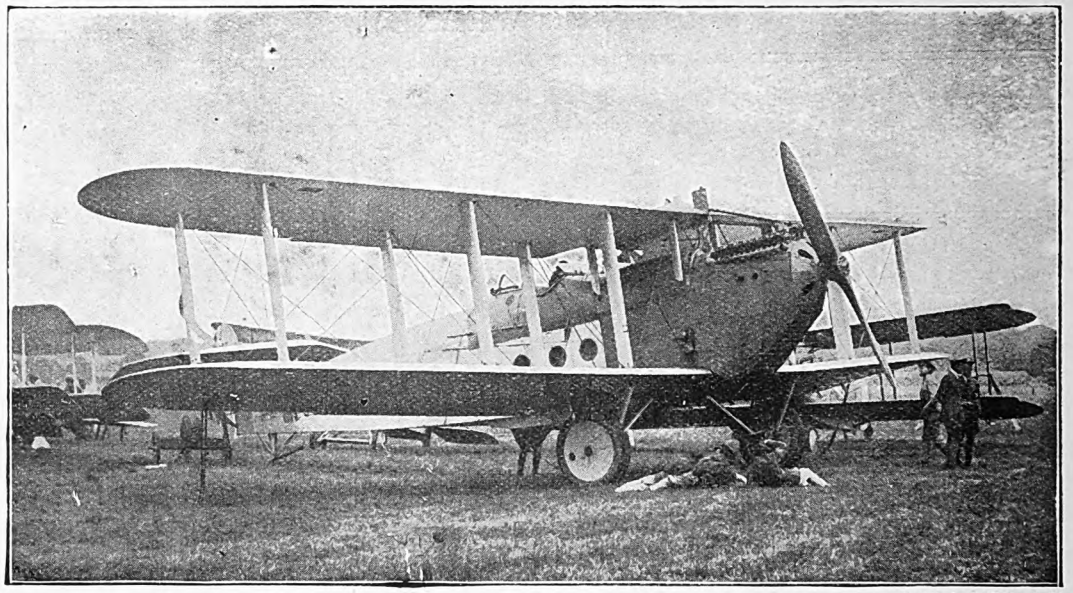

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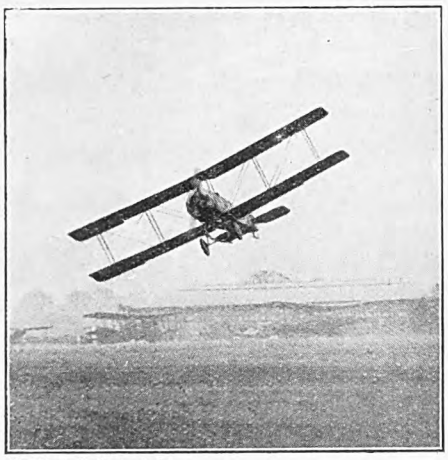

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THE AEROPLANE

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ON MONGOLS AND THINGS.—(I.)

["On Secret Patrol in High Asia" by L. V. S. Blacker (Captain, "The Guides"), 301 + XI pp. John Murray. 18s.]

Some few of the old-timers at Brooklands of the 1910-11 vintage, and some of the early-war R.F.C. people will remember Blacker of the Guides.

To the former he is chiefly famous for having smitten a famous aeroplane pioneer on the nose. The incident occurred in this wise. Blacker came to Brooklands to learn to fly. He joined a certain flying school which agreed to supply him with a machine on which to learn. One evening another pupil crashed the school's only aeroplane. The next morning Blacker came down to fly and there was no machine. He being of a masterful mind addressed himself in the vernacular to the owner of the school, who being himself accustomed to nigger and lascar firemen on the Seven Seas replied in similar terms. Both are men of action but in this case Blacker got there first. The pioneer sported a black eye for a few days and Blacker departing learned to fly elsewhere.

Thereafter he rejoined his regiment in India and did not join the R.F.C. when it was formed. How much time he put in with the regiment and how much he spent promenading along the very definite frontier up in the Pamirs which separates Kashmir, Chinese Turkestan and Russian Turkestan is not for us to know. Nor are we told in the book how it was that before the War 1914-18 when we all regarded Russia as our most likely enemy he was hob-nobbing with Orenburg Cossack patrols on 10,000 foot plateaux. Still less do we gather why when the war began he found himself in Yarkand, well away in Chinese territory.

The one clear fact at the beginning of the book is that at Kashgar in Eastern Turkestan two days later he learned that there was a real war in Europe, and apparently fearing lest he might miss the fun if he made the long journey back into India he trekked to the rail-head of the Russian strategic railway at Andijan on the Northern Afghan frontier and thence wangled his way across Russia, Finland, Sweden, Norway and the North Sea to England, where he joined the R.F.C. after a period of service with Punjabi troops in the Ypres Salient.

When serving with the R.F.C. he was shot down, turned over on landing and broke his neck, always an inconvenient thing to do. He says nothing of this in the book but one feels that it ought to be recorded for the amazing adventures told in the book appear somewhat more amazing when one considers that they were performed by one whose head has a traverse of about 30 degrees and an elevation of perhaps 15 degrees.

The Frightfulness Department.

While convalescing from this contretemps he was brigaded with sundry evil spirits at Adastral House (formerly De Keyser's Hotel) in a sub-section of the Department of Supply and Equipment which dealt with gunnery and armament. This sub-section was known unofficially as the Frightfulness Department and there with one Coote, a Hussar officer, and another Billinghurst, a steel specialist, Blacker made horrible experiments in bombs and things which filled the interior of Adastral House with explosions and mephitic vapours which greatly perturbed the amiable General McInnes who was their titular chief.

Sir Ralph Coote, as he now is, has distinguished himself by preserving his house and estates in Ireland intact to this day, and one can only imagine that he has done it by means learned in the Frightfulness Department. In Ireland the phrase "as mad as a coot" is common, and having known many of the name one is still in doubt whether the phrase refers to the family or the duck. Anyhow the products of these mad people in that department were very useful in the war, for they were the beginnings of our present bombs and bomb-gear.

There must still be many who remember how when they visited the Coote-Blacker-Billinghurst conspiracy and sat according to custom on a pile of papers on a chair or on a table a camouflaged bomb was liable to explode under them as an indication that they were not welcome. There was one individual who avoided such hints by carefully removing despatch-boxes and papers and sitting on the bare table. He was ultimately evicted by a bomb which blew *down* on him out of an apparently innocent electric light pendant. All of which was part of the rest-cure which resulted in Major Blacker, as he had become, being fit by the end of 1917 to go back to India and command his Regimental Depot.

One mentions these few facts which are not in the book by way of giving a rough general impression of the man who wrote it. To them one may add further that he belongs to an eminently respectable Irish-Anglo family of ecclesiastical tendencies—Canon Blacker was an object of reverence in one's youth—pertaining to the County Wexford, which county has also given us the Beattys—namely the present First Sea Lord and that excellent Lieut.-Colonel of Flying Corps who later descended to Civil Aviation.

A Foretaste.

A year or two after the War one was lunching one day at the Junior Naval and Military Club with a certain Tony Brian—also from the County Wexford and late R.F.C.—when Major Blacker came in and joined us. The talk turned towards his experiences after leaving Adastral House and ultimately he was induced to tell us much of what appears in this book and a good deal that does not. It was nearly 18.00 hours before one could tear oneself away, weak with laughter and with a brain whirling with the higher strategy, the lowest tactics, ethnology, politics, the most wildly improbable adventures and the most hilariously improper episodes all told in the quiet matter-of-fact way which hitherto only Rudyard Kipling has succeeded in putting on paper. And one prayed that Blacker might be spared to put them all into a book as he promised.

He has been better than his word, for he has made a book which is not only the most mirth-producing thing which has appeared for many a year but he has written in with it a treatise on ethnology and strategy which will be of the highest value to all of the King's Fighting Services who will take part in the Great War which is coming. Which is why this much space is given to the book.

The Beginning of Things.

Briefly Blacker's adventures as related in the book amounted to this. Early in 1918 when Russia was in the hands of the Bolsheviks "tens of thousands of tons of cotton of Ferghana" lay "ready baled in the warehouses and on the wharves of Turkistan" and "it behoved us to take some energetic step to prevent this priceless raw material from reaching the nitrating shops of Germany whether by way of Moscow or through Krasnovodsk (on the Caspian) and the Caucasus." So Sir George McCartney—our representative in Chinese Turkestan—with Major Blacker and sixteen soldiers posing as peaceful merchants were sent into Russian Turkistan (we were still not at war with the Russian Republic) to buy up the Turcoman cotton crop.

They made Tashkend their headquarters and succeeded in their task. Incidentally when Major Blacker told this part of his story in the "Incubator," as the Junior Naval and Military Club is called familiarly, one asked him how he passed as a merchant among the Bolshies, for he is in appearance the typical British officer, short-cropped moustache, gold-rimmed eye-glass and all, as worn. To which he replied in his quiet drawl,—"Well you know, as a matter of fact I'm afraid the Bolshies did rather regard my eye-glass as the mark of a capitalist."

However, Sir George and he and their people got away unassassinated and made for peaceful India. On their way down to Kashmir they came across rumours of certain Afghan Bolshy emissaries who were breaking across the Pamirs to Su-Kiang, or Chinese Turkestan, to stir up trouble in the new Chinese Republic.

Consequently Major Blacker was detached to find them with an assorted force of fourteen men, composed of Hunza levies (of almost pure Greek descent) and a few of his own Guides. They chased the Afghans across the mountains of the Kuen Lun—far to the North of the Himalayas—over passes running up to 16,000 and 17,000 feet, a pretty good effort. They ran their men to earth in the Badakshi Sarai in

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY, JUNE 30.

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Yarkand City, chained them together, bluffed the Chinese Governor that the prisoners were British-Indian criminals, exchanged polite visits (and cards) with the Governor and marched the lot into British custody in Kashgar. A gorgeous piece of nerve.

After that the party returned home, Blacker arriving at Delhi via Gilgit and Rawalpindi. Here after a few days he was ordered off to a private war which was going on along the Russo-Persian frontier, where three companies of Punjabis, two squadrons of Indian cavalry and an assorted rabble of mongrel Kurdish and impure Persian levies were holding a battle-front with its left flank on the Caspian and its right on the Afghan frontier, roughly one man per two miles of front, a somewhat strenuous job. Their task was to keep the might of the Red Russian Republic from breaking into and breaking up the kingdom of Persia. The hilarious story of this campaign fills the latter half of the book.

All the way through Blacker treats war as such as the greatest joke in the World. On equipment, tactics and strategy he is quite serious. But the one subject which is of prime importance to him is ethnology and its bearing on the War 1914-18. And to this side of his work one commends the close attention of his readers for the curious effects of racial and tribal differences in this little war have direct and portentous bearing on the Great War which is to come.—C. G. G.

(To be Continued.)

THE INTERNATIONAL AIR CONGRESS.

[The following notes will explain to some extent the objects and organisation of the Air Congress of which we have heard so much and understood so little during the past few months. The information is in the main as communicated by the Executive Committee and one publishes it with pleasure after having emended and amended the wording in accord with the usage of the English language.—C. G. G.]

The first International Air Congress to be held in England will take place at the Institution of Civil Engineers, Great George Street, from June 25 to 30, under the Presidency of Group Captain H.R.H. the Duke of York. Lord Weir of Eastwood, formerly Secretary of State for Air, is Vice-President of the Congress.

H.R.H. the Prince of Wales has graciously consented to open the Congress at 10 a.m. on Monday, June 25, and the Duke of Sutherland, Under-Secretary of State for Air, will deliver the inaugural address. Sir Samuel Hoare, Secretary of State for Air, will preside at the last session of the Conference on Saturday, June 30 and will deliver the closing address.

The first International Congress was in 1889 in Paris; since then meetings have been held at Chicago, Milan and Nancy. The last Congress, in 1921, also met in Paris when the President of the French Republic opened the proceedings in person.

THE WHY OF THE CONGRESS.

The objects of the Congress are to bring together leading representatives in Aeronautical Science from all parts of the world to review progress and to stimulate international endeavour in furthering aeronautical development in all its branches. That these objects will be achieved is shown by the fact that in addition to a thoroughly representative delegation of British aeronautical interests, there will be official delegates and individual members from, amongst other countries Belgium, Canada, Chile, China, Denmark, France, Holland, India, Italy, Japan, Norway, Poland, Roumania, Spain, Sweden and the United States.

Among the distinguished Foreign delegates attending are M. Laurent Eynac (French Under-Secretary for Air), M. P. E. Flandin (President of the Aéro Club de France), M. Louis Bréguêt (Chairman of the Chambre Syndicate des Industries Aéronautiques de France—the French S.B.A.C.), Col. Van Crombrugge (Director of Aeronautics for Belgium), and Major Herrera-Linares and Lieut. Espinosa de Los Monteros, representing the Spanish Government. Mr. J. J. Ide represents the United States National Advisory Committee for Aeronautics, Ingeniero Umberto Nobile the Italian Government Airship Construction Establishment, Dr. Wolff the Nederlandsche Rijks-Studiedienst voor Luchtvaart, Mr. Gregerson the Norwegian Ministry of Public Works, and Colonel Mossberg represents Swedish interests.

The organisation of the Congress has been undertaken by a Committee of which the Duke of Sutherland is President with Major-Gen. Sir Frederick Sykes, M.P., as Chairman of the Executive Committee. Representatives of the Air Ministry and other Government Departments are on the Committee as well as leading members of the British aeronautical associations and constructors of aircraft.

THE PROGRAMME.

The programme arranged by the Committee provides for the reading and discussion of papers on Monday, June 25, Wednesday, June 27, and Friday, June 29. Tuesday, June 26, and Thursday, June 28, are open for visits to Government Aircraft Establishment, R.A.F. Stations and the works of aircraft constructors. On Saturday, June 30, after the concluding address by Sir Samuel Hoare, members of the Congress will have the opportunity of attending the R.A.F. Pageant, at Hendon. [If they can manage to get there after the meeting is over. As a rule it is necessary to leave London by midday to reach Hendon at all on the day of the Pageant.—C. G. G.]

In order that all aspects of aviation may receive adequate attention, the Congress will be divided into four main groups, which will meet simultaneously each day under separate chairmen.

Group A, will deal with "aerodynamics, construction and research. Papers in this division will be read on the following subjects:—Methods of Research; Aerodynamics; Controllability; Structural Methods and Materials."

Group B, will deal with the question of Power Plants, Fuels and Lubricants and Propellers. [It is not clear whether this last word means "Propellants" or Airscrews.—C. G. G.]

Group C, will deal with Air Transport and Navigation. The main subjects on which papers will be delivered in this Group are Technical Aspects, Engineering Problems, Commercial Problems, and Medical and Legal Questions.

Group D, will deal with Airships both from the commercial Problems, and Medical and Legal Questions.

THE SOCIAL PROGRAMME.

In addition to the main business of the Congress, several important social functions have been arranged. On Monday, June 25, there will be a reception by the President (H.R.H. the Duke of York) in the King Edward VII rooms, Hotel Victoria, Northumberland Avenue; on Wednesday the Lord Mayor will give a reception at the Mansion House, and the following evening the Duke of Sutherland will entertain members at Hampden House.

On Friday evening there will be a visit to the Science Museum, South Kensington, and on Saturday, after the visit to the R.A.F. Pageant, Hendon, a final banquet will take place at the Hotel Victoria in the evening, at which the Duke of Sutherland will take the chair. [That is if anybody succeeds in getting away from Hendon in time to dress and dine. One's own experience, and after some 25 years of driving in traffic, is that if one leaves Hendon at the end of the Pageant one arrives in London about 20.30 hrs. So the banquet ought not to begin till 21.00 or 21.30 hrs. if it is to be a success.—C. G. G.]

Arrangements have been made for the fourth meeting of the International Commission on Air Navigation to take place in London during the same week, and the delegates to the Commission are to be entertained at Lancaster House by the British Government on Tuesday evening, June 26.

Membership of the Congress is open to anyone in any country which is a signatory to the International Air Convention, or is represented on the Fédération Aéronautique Internationale. The subscription fee is one pound. Applications for membership can be received by the Secretary, The International Air Congress, Albemarle Street, W.1.

[Naturally the representative nature of the Congress is quite spoiled by the absence of representatives of Germany. Without them the scientific, constructional and commercial aspects of aeroplanes and airships cannot be discussed adequately. Presumably there will be German representatives at the meeting of the Commission on Air Navigation. But in any case it is merely childish to bar from an affair which calls itself "International," representatives of a nation with which we were at war five years ago, longer ago in fact than the duration of the war itself.—C. G. G.]

THE GROSVENOR CUP.

There will be about ten starters for the race on June 25 for the Challenge Cup and Prize offered by the Lord Edward Grosvenor. The start and finish are Lympne and the machines will make a 400-mile circuit via Croydon, Birmingham, Bristol and Croydon. They are expected at Croydon on the outward journey at about 10.30 hrs. and on the home leg at about 16.30 hrs.

Those who have so far entered are as follows: Lt.-Col. F. K. MacLean, a Sopwith "Gnu" piloted by F/Lt. W. H. Longton; the Bristol Aeroplane Co. a "Lucifer" monoplane and "Lucifer" biplane flown respectively by Major E. L. Foot and Mr. Cyril Uwins. S/Ldr. Robinson on a Boulton and Paul P.9, P/O. J. S. Newall on a R.Ae.C. Avro, Mr. F. P. Raynham on his own Clergêt Avro, Mrs. Oliver Atkey on a D.H.6 and the Aircraft Disposal Company's Avro flown by Capt. Rex Stocken. In addition to these, Mr. Bert Hinkler will probably fly a "Baby" Avro and Mr. J. Lankaster Parker may compete on the "Gnosspelicopter," which is faster than the D.H.6.

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY, JUNE 30.

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The International Air Congress, London, 1923

(June 25 - 30).

PROGRAMME.

Monday, June 25th.

10.45 a.m. Opening of Congress by H.R.H. the Prince of Wales, K.G., at the Institution of Civil Engineers, Great George Street, Westminster.
Inaugural Address by His Grace the Duke of Sutherland.
2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers, Great George Street, Westminster.
9.0 p.m. Official Reception of Members by the President (His Royal Highness the Duke of York, K.G., K.T.), in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, S.W.1.

Tuesday, June 26th.

Visits by Members to various places of Aeronautical Interest.

Wednesday, June 27th.

10.0 a.m. & 2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers.
9.0 p.m. Reception of Members by the Right Honourable the Lord Mayor of London, at the Mansion House.

Thursday, June 28th.

Visits by Members to various places of Aeronautical Interest.
10.0 p.m. Reception of Members by His Grace the Duke of Sutherland, at Hampden House.

Friday, June 29th.

10.0 a.m. & 2.30 p.m. Simultaneous Sessions of Groups A, B, C, and D, for Reading and Discussion of Papers at the Institution of Civil Engineers.
9.0-11.0 p.m. Visit to the Science Museum, South Kensington.

Saturday, June 30th.

10.0 a.m. Concluding Meeting of Members in General Assembly, under the Chairmanship of the Secretary of State for Air (Lieut.-Colonel the Right Honourable Sir Samuel Hoare, Bart., C.M.G., M.P.), at the Institution of Civil Engineers, Great George Street, Westminster.
8.15 p.m. Official Banquet in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, S.W.1, the Duke of Sutherland in the Chair.

Terms of Membership.

The Qualification for Membership is nationality of a country which is either a signatory of the International Air Convention, or represented on the Federation Aeronautique Internationale.

The Subscription is One Pound Sterling or its equivalent in Foreign Currencies at date of Application.

Individuals belonging to the Families of Members may become Associate Members at a reduced Subscription of Ten Shillings.

GENERAL SECRETARY, Lt.-Colonel W. Lockwood Marsh,
7, Albemarle Street, London, W.1, England.

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R.A.F. INTELLIGENCE

Appointments.

GENERAL DUTIES BRANCH.—W/Cmdr. J. E. A. Baldwin, D.S.O., O.B.E., to H.Q., Middle East, Egypt, 1/6, for Personnel Staff duties.

S/Ldr. J. Kemper, M.B.E., to Aircraft Depot, Iraq, 13/4.

F/Lts. R. J. Slade, D.S.C., to No. 4 Armoured Car Company, Iraq, 24/4; J. W. Hosking, M.B.E., and L. H. Browning, M.C., D.F.C., to H.Q., M.E., Egypt, 10/5.

F/Os. J. F. Horsey, to No. 30 Sqdn., Iraq, 17/5; C. C. Clark, to Basrah Grp. H.Q., Iraq, 14/5; W. E. James, to No. 267 Sqdn., Malta, 18/5; R. Tuck, to No. 2 Armoured Car Company, Palestine, 1/6; P. W. Lingwood, to No. 216 Sqdn., Egypt, 18/3; J. E. V. Lindsey, to No. 55 Sqdn., Iraq, 11/5, J. L. Hayward, to No. 28 Sqdn., India, 10/5; E. C. N. Jeffries, to No. 28 Sqdn., India, 10/5; H. C. Pyper, to R.A.F Staff College, Andover, 12/6, for Administrative duties; O. D. Freeman, to School of Army Co-operation, Old Sarum, 1/6; L. H. Weedon, to R.A.F. Depot, 1/6, on appointment to a S.S. Commission.

P/O. C. J. Stone, to No. 2 Sqdn., S. Farnborough, 11/6.

MEDICAL BRANCH.— S/Ldrs. (Medical) A. J. Brown, D.S.O., to Central R.A.F. Hospital, Finchley, 23/6; A. S. Glynn, M.B., to H.Q., Iraq Command, 1/6.

F/Lts. (Medical).—W. G. L. Wambeck, to No. 1 School of T.T. (Boys), Halton, 20/6; E. G. S. Hall, M.B., to R. A. F. Depot, 4/6.

STORES AND ACCOUNTANTS BRANCH.—S/Ldrs. (Stores) L. Auker, O.B.E., to No. 4 Stores Depot, Ruislip, 19/6.

F/Os. (Stores) D. Barron, to C. & M. Party, Hawkinge, 8/5; J. R. Gardiner, to I.A.A.D., Henlow. 11/5.

CHAPLAINS' BRANCH.—The Rev. M. J. Eland, to Basrah Grp. H.Q., Iraq, 13/12.

From the *London Gazette*, June 5.

AIR MINISTRY, JUNE 5.—R.A.F. GENERAL DUTIES BRANCH:—

The following promotions are made: F/O. to be Hon. F/Lt.—C. M. E. Gifford (Feb. 15). P/Os. to be F/Os.—S. R. Boldero (Dec. 12, 1922); R. G. R. Godby (Mar. 29); S. F. Coles (Apr. 4); C. E. B. Winch (May 7); R. H. Windsor (May 29); H. A. Bayne (May 29); A. E. Golds (May 29); N. M. Ffrench (May 29); C. McL. Reid (June 1); M. V. Ward (June 1); J. F. Bythell (June 2); H. W. Beck (June 8).

The following Observer Officers are transferred to the Reserve, Class B.: F. W. Brown (June 2); J. Mitchell (June 5). F/O. G. A. Pennington resigns his permanent commn. (June 1)

The following F/Os. relinquish their temporary commissions on return to Army duty: R. H. Miles (Lt., Q.O. Royal West Kent R.) (May 29); W. R. F. Clover, M.C. (Lt., R.G.A.) (May 30).

The R.A.F. Nursing Service.

The Air Ministry have made the following announcement:—"Her Royal Highness Princess Mary, Viscountess Lascelles, has been graciously pleased to become Patroness of the Royal Air Force Nursing Service and to give her permission for it to be re-named 'Princess Mary's Royal Air Force Nursing Service.'"

The Independent Force Dinner.

The fifth Annual Reunion Dinner of the Independent Force, including all officers of Army Troops and other attached Units, will be held at the Hotel Cecil on Tuesday, June 26, at 7.45 p.m. for 8 p.m.

Air Chief-Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., A.D.C., will be in the Chair.

Evening dress with miniatures will be worn.

Tickets, price 15s. (excluding wines), may be obtained from the Hon. Sec. I.F. (R.A.F.) Dinner Club, Room 546, Adastral House, Kingsway, W.C.2, to whom any alteration in address should be sent.

The Dunkerque Dinner.

The fifth Annual Dinner for officers who served in the Dunkerque Command of the R.N.A.S. and the R.A.F. from 1914 to the Armistice will be held at the R.A.F. Club on Wednesday, June 27, at 7.30 p.m. for 8 p.m.

The Chair will be taken by Air-Comdre. F. C. Halahan.

The tickets are £1 each, which sum should be forwarded with the application. Those who wish to be present should apply not later than June 24 to Treasurer, Dunkerque Dinner, R.A.F. Club, 128, Piccadilly, W.1.

The Middle East Dinner.

The Middle East Dinner held at the Café Royal on June 6 was a huge success. Over 180 past and present Middle Easters attended, which is a record for R.A.F. feasts. Sir Geoffrey Salmond, the creator of the R.A.F. in that area, presided and his reception when he rose to speak left no doubt about the esteem in which he is held by those whom he commanded. He told of the early days of the old 6th Wing and its expansion till it included everything from Salonique to India and down to Central Africa. Lieut.-General Ironside, the guest of the evening, and now Commandant of the Army Staff College at Camberley, told the R.A.F. what capital people they were, and how the Army could never do without them, and made it clear that he bore no malice to them for having crashed him and broken his leg in Mespot., as related by Sir Geoffrey. He was particularly complimentary to the R.A.F. personnel who served under him in North Russia.

Sir Sefton Brancker, ignoring Civil Aviation for the time being, and speaking as a Middle Easter as he said of three months' service, told of how from a well-polished chair in the War Office he had starved the Middle East of machines and equipment so that the West Front might be as well supplied as possible; as is usual it was a capital speech full of sound sense, good history, and humour. Air Vice-Marshal Oliver Swann spoke for the R.N.A.S. in the Mediterranean. Air-Commodore Borton bore witness to Sir Geoffrey's work in the war in Palestine and modestly concealed his own doings. Major Wyndham Birch spoke for the Salonika Wing and his old C.O. "Father" Dawes, who unfortunately was not present. Captain Hunt said a few well-chosen words for the East Africans. And Lt.-Col. J. E. Tennant disclaimed any credit for work in the clouds above Baghdad, attributing everything to his revered chief.

A signal honour was paid to the R.A.F. by the Cameron Highlanders who were holding their regimental dinner in the building. Two of their senior Lieutenant-Colonels came to take wine with the R.A.F. and brought with them the regimental pipers, who were enthusiastically received. Incidentally, in case of the recurrence of such an event, one would remind the younger officers of the R.A.F. that the march of the pipers is to Highlanders a religious rite and should not be greeted with yacht noises and hunting cries under the impression that these are the invocations proper to a Highland fling. Still the youngsters meant well and no doubt our Northern Allies understood.

The dinner was perfectly run and F/Lt. G. C. Anne, the organiser, is to be congratulated on his staff work. It is to be hoped that all future Middle East gatherings may be as wholly successful. One only regrets that lack of space makes it impossible to publish in full the many valuable and witty things said by the speakers. Perhaps in the future of a Big Air Force and correspondingly big AEROPLANE it may be possible to do so.—C. G. G.

The R.A.F. Pageant.

The R.A.F. Aerial Pageant will take place at the Aerodrome at Hendon on June 30, and special arrangements have been made to deal with the traffic. The Committee have acquired the use of the sloping fields at the South-East end of the Aerodrome which will side-track a goodly proportion of the populace from the narrow hill to the Aerodrome where there is always such a bad block of traffic, the entrance to these fields being at the top of the hill.

One of the most interesting items in the programme will be the parade of the latest types of war aircraft. A number of these machines have hitherto been regarded as "secret" and at the Pageant will be seen by the public for the first time. They will include troop-carriers, bombers, fighting machines, naval fleet-spotters, army reconnaissance machines and all-metal aircraft.

The "Wren," weighing only 210 pounds and with a 3½ h.p. engine, will be flown by F/Lt. Longton, and the "Aldershot" Avro, with a 1,000 h.p. Napier "Cub" engine, will be flown by S/Ldr. Roderic Hill. Both these machines may be looped and stunted.

In addition, there will be plenty of racing, stunt flying, and crazy flying.

The set-piece of the Pageant will be based on the evacuation last year of Suliemanie, in Northern Kurdistan, when a number of military and civil personnel were rescued from the beleaguered town by R.A.F. personnel in Vickers' "Vernons" escorted by single-seater fighters. The episode in the Pageant will show the town being attacked by hostile forces, the population carried to safety in troop-carrying aeroplanes, a bridge demolished and all the other little incidents of a perfectly good war.

Last year proved that it is not even necessary to have good weather to have a good Pageant, but given a decent day this year is likely to be a record one both from the point of view of the spectators and the R.A.F. Memorial Fund.

Tickets can now be obtained from the various agencies. Boxes to hold six are £4, £5 and £7, and tickets are 10s. and 5s. Tickets for the 2s. enclosure are only obtainable at the Aerodrome on the day of the Pageant.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

The R.A.F. Athletic Association.

The following open events will be included in the Army Athletic Championship at Aldershot:—(a) 1 mile race open to all ranks serving in the R.N., R.M., R.A.F., or Territorial Army; (b) 880 yards race open to Cadets at the R.N.C., R.M.C., R.M.A., R.A.F. (Cadet) College, and Midshipmen R.N.

Three prizes will be given for each race, and entries, together with entrance fee of 2s. 6d. for each competitor in each race should be sent to the Hon. Sec., Army Athletic and Cross Country Association, c/o. Hut 13, Command H.Q., Aldershot, before June 30. The races will be run on the second day of the meeting, July 18. The Committee reserve the right to declare the races void should less than 6 entries be received for each event

The Royal Tournament.

The Royal Tournament took place at Olympia from May 25 to June 9. The results of the competitions in which the R.A.F. took part were as follows:—

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY, JUNE 30.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

Some rather surprising information as to the errors which may be introduced into the results of wind-tunnel tests by the interference effects caused by the arrangements for supporting the models is discussed below.

In so far as these effects disturb the accuracy of model measurements they are of very considerable importance, but the facts raise a still more important question as regards full size aeroplane design. If so insignificant a body as the ordinary spindle used for supporting a model in the wind-tunnel can produce so large an effect, how much more important may be the effect of the assemblage of body, struts and wires which are usually found in the vicinity of the wings of the average biplane.

And further, how many of the supposed differences between full scale and model results are due to the effects of interference of interference caused by small details of the real machine which cannot be reproduced in the small model?

A very interesting school and joy-ride machine, which can be used either as a land machine or a seaplane, has just been produced by the new German firm, Ernst Heinkel Flugzeugwerke. A description and photographs of this machine are given in this issue.

Illustrations of the Parnall "Possum," a machine quite well known to all who are really in touch with recent developments, appear in this issue. This machine is one of the Air Ministry's "Secrets," so may not be described.

CONCERNING INTERFERENCE.

A recent Technical Note (No. 130) of the American National Advisory Committee for Aeronautics entitled "Model Supports and their Effect on the Results of Wind-Tunnel Tests" contains a good deal of information on a subject which is really of very considerable practical importance.

After all model tests are at present the basis of practically all aeroplane design, and the very important effect on the results of these model tests of the interference which may occur between the model and the arrangements used for testing it are in many cases sufficient to account for very large apparent discrepancies between model and full-size results.

A Startling Example.

As an extreme example of interference, this particular report instances the case of a sphere supported by a fine vertical wire and by a horizontal spindle bent to the vertical some way behind the sphere and there attached to the balance-spindle. The measured resistance of the sphere wire and spindle was .372 kg. The measured drag of the wire alone was .014 kg. When the wire was removed the drag of sphere and spindle was only .169 kg., whereas if one subtracted the measured wire drag from the first result one might have concluded that it would be .358 kg. The drag of the wire alone was only 4% of the drag of the whole assembly, but as part of the assembly the wire more than doubled the whole resistance.

By retaining the wire and removing the spindle it would have been possible to obtain figures for spindle drag and spindle interference, but it is not possible in this way to obtain the sum of the two interferences and so arrive at the true resistance of the sphere. This is because there is an interference by the wire with the resistance of the spindle and vice-versa.

The report goes on to suggest that in tests of model aerofoils the relatively-extended span of the model allows one to use supports so far apart that their mutual interference is negligible, and thus renders it possible to measure the effect of removing one support at a time with a reasonable assurance that in so doing one can measure the true effect of each form of support with good accuracy.

Tests on Spindle Interference.

In America it is stated that four different types of support are in regular use for supporting model aerofoils under test, and at least as many more are in use abroad. Some laboratories introduce corrections for the influence of supports—others neglect this correction entirely. Even among those which apply corrections there is no uniformity of practice.

In order to investigate the effect of supports a model 4 inches by 24 inches of U.S.A. 16 section was tested in the N.A.C.A. wind-tunnel. This was supported on horizontal skids below the aerofoil, which were in turn supported from the balance by wires. Tests were made under these conditions, and without any other disturbance, a dummy spindle ⅝-in. dia. was brought into close proximity first with one wing-tip and then to the upper and lower surfaces midway along the span.

The wing-tip spindle has little effect at low-lift coefficients, but it reduces the lift at large angles of attack, with the result that the drag at a given lift coefficient is increased in this case to a maximum of about 10%. The spindle on the lower surface *decreases* the apparent drag of the aerofoil by a maximum of about 13% at a lift coefficient of about .25, this effect thereafter decreasing until no noticeable effect is discoverable at a lift coefficient of about .4.

The spindle on the upper surface increases the drag at a rate increasing with the lift coefficient until it reaches a figure of 40% greater than that without the spindle.

An attempt was made to measure the effect of the skids used to support the original model. To do this it was carried from an N.P.L. balance by a wing-tip spindle. Measurements were then made with the wing and spindle alone, of the wing with two skids attached, and an isolated skid.

The difference between the drag with no skids and with two skids was found to be twice the measured drag of one skid within the limits of accuracy of measurement of the balance.

This result would appear to suggest that the skids used on the N.A.C.A. balance produced no interference effects, but it would be unwise to accept this conclusion too definitely.

Experience of the Eiffel Laboratory.

In an appendix reference is made to a report received from the Eiffel Laboratory in France which announces that as a result of the use of supporting brackets attached to the top of the aerofoil models tested there, the drag figures given in all the previous reports of that laboratory are uniformly high. This report claims that if the brackets are attached to the lower surface there is no interference.

M. Eiffel states that the effect of interference in aerofoil models is confined to an effect on the "induced drag" and is practically equivalent to a change in aspect ratio. It is suggested that the earlier figures given by the Eiffel laboratory can be corrected by assuming the figures to apply to an aerofoil having an aspect ratio 2 less than the real aspect ratio.

The American Note remarks that no proof is offered of the truth of the suggestion that the bracket on the undersurface of the wing has no interference, and suggests that in all probability the lower bracket has an interference effect in the opposite direction and of roughly equal magnitude to that of the upper surface bracket. Thus the earlier Eiffel tests may be taken to represent tests on models of an aspect ratio 1 less, and the more recent one of models with an aspect ratio 1 more than the real aspect ratio.

Certain figures from the Amsterdam Rijksstudienst v/d

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Luchtvaart show a distinctly-reduced drag on aerofoils supported from the lower surface as compared to those supported from the top surface.

Tests made in the University of Toronto with end spindles and with a cranked spindle attached to the lower surface of the model show a distinct decrease of drag, of a maximum of 10% in the case of the latter support. From all of which it is perfectly obvious that the effect of the precise method of model support is of the very greatest importance as the same model tested with two different support arrangements may have an apparent drag coefficient varying by 25% or even more.

From the wind-tunnel point of view it is obviously important that this subject should be very thoroughly investigated. At the present moment it appears to have received relatively little attention in most laboratories.

HOW MUCH INTERFERENCE EXISTS IN THE FULL-SIZE MACHINE?

But the facts outlined above have a further significance. Quite large effects are obviously produced by the presence of extremely small supports often very carefully streamlined in the near vicinity of a model aerofoil. The aerofoil in a real aeroplane has in its immediate vicinity bodies of much greater size and of very appreciable resistance. If one central support on a model can change the model resistance by 10% what is the effect of the eight or twelve interplane struts plus the body of the average modern biplane?

If one may judge from the results of full-size tests they appear to more or less cancel out, the effect on the top wing and that on the bottom being of opposite sign and roughly equal in magnitude in most cases.

BENEFICIAL INTERFERENCE.

In the case of the cantilever monoplane the tests suggest that a body below the wing may improve the effective performance of that wing, and that one above the wing should appreciably impair the wing. Model experiments—and full-size tests—appear to confirm this, and in fact there is evidence of a very fairly conclusive nature that a wing and body combination can be made to have a lower total drag than that of the wing alone.

In any case the facts seem to show conclusively that tests on wing models alone are very unsatisfactory bases on which to design aeroplanes, and that this problem of the nature of the interference effects encountered as between wings and other parts of the aeroplane require very much more investigation than has yet been given to them.

M. Eiffel's statement that the interference effect of supports on model wings is confined to the induced drag, and is the equivalent of a change in effective aspect ratio is extremely interesting, particularly to the present writer who some time ago came to the conclusion that the beneficial interference which has been observed to occur in certain cases when a relatively large body was placed below a monoplane wing could only be explained by supposing that the effect of the body was either :—

(1) To cause an up-current in the neighbourhood of the wing and so lead to a tilting forward of the total resultant force on the whole wing—which is the equivalent to the effect of increasing the aspect ratio and reducing the induced drag, or

(2) By slowing up the air-flow on the lower surface to force a somewhat more vigorous circulation round the wing than would occur at the same angle of attack were the body absent. This again would have an effect analogous to that of an increased aspect ratio.

THE POSSIBILITY OF GETTING SOMETHING FOR NOTHING.

In all probability both of these effects are factors in the phenomenon, and the only point which remains for surprise is the fact that one can so to speak actually "lift oneself by hauling at the slack of one's pants."

On general principles one would have expected that the resistance involved in producing the beneficial air-flow required to account for the phenomena would have exceeded any possible improvement in wing-drag. Actually apparently one can get quite a good deal for nothing in this particular way.

And as aviation at the present moment very urgently needs all that it can get for nothing it seems very necessary that this question of interference effects should become a subject of intensive study by all those whose business it is to advance our knowledge of aeronautics.

There is very strong reason to believe that interference is really the explanation of many of the discrepancies which it is now fashionable to attribute to "scale effect," and it is quite likely that if our wind-tunnel experts will only get to work seriously on this particular subject they may find it possible to give V.1. a much-needed rest.

A GERMAN CONVERTIBLE MACHINE.

The machine illustrated in the accompanying photographs is the first product of the new German firm known as "Ernst Heinkel Flugzeugwerke," of Warnemünde. Herr Ernst Heinkel the moving spirit of the concern is among Germany's oldest and most prominent designers. He was responsible for the 1913/14 Albatros tractor biplanes, during the war he was designer to and director of the Hansa-Brandenburg Flugzeugwerke. After the war he joined the Caspar-Werke at Travemünde where he designed the little Caspar Heinkel Seaplane V.1, which was intended to be carried on submarines or other small craft, and a specimen whereof has been acquired by the U.S. Navy. Early this year Herr Heinkel left the Caspar-Werke and founded the firm which bears his name.

The machine now in question known as the type H.E.3 was tested at Warnemünde during the last week of May. As the photographs show it is a cantilever monoplane of the "low-wing" type originated by Dr. Junkers, but built of wood, seating three persons, and intended for school or joy-ride purposes.

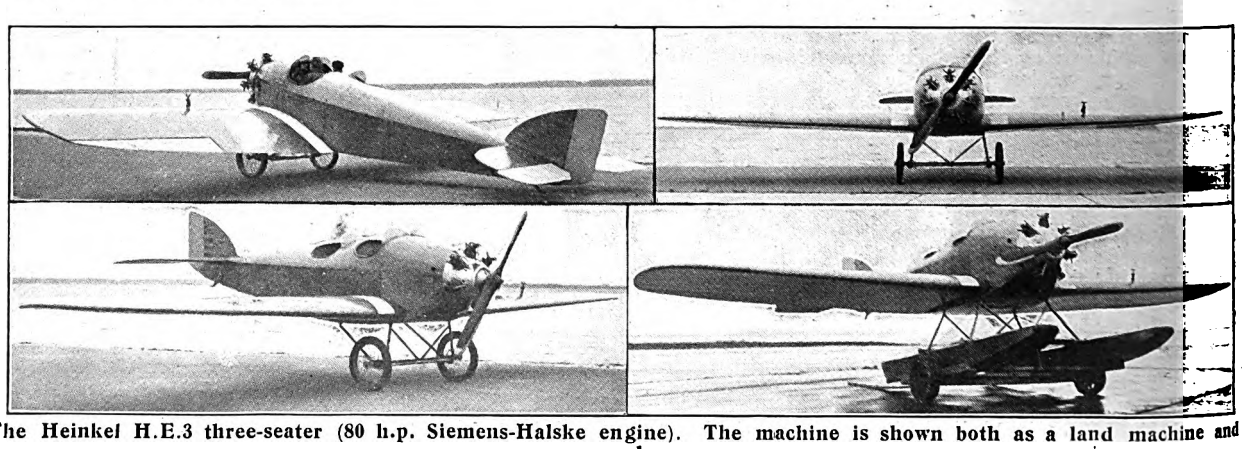
The machine is readily convertable from a seaplane to a land machine, the two undercarriages forming completely-braced structures which can be interchanged by undoing and doing up again two fastenings only.

The wings, which are in two pieces, are equally simply attached and detached. The spar roots are tapered and fit into sockets in the fuselage side. They are held in place by four bolts each, and the whole of the eight bolts are withdrawn or inserted by the movement of a handwheel in the underside of the fuselage. Tests made in the presence of an official Swedish Naval Commissioner showed that a crew of six men could change the machine from a land machine to a seaplane in 65 seconds, from seaplane to land machine in 32 seconds, could remove the wings in 24 seconds, replace them in 27 seconds, and could remove both wings and undercarriage from the land machine in 35 seconds, replace them in 49 seconds, and could carry out the same operation on the seaplane in 38 and 63 seconds respectively. With two men only the various operations can be carried out in about six times the period required by six men.

The fuselage is three-ply covered, and contains seats for pilot and one passenger side by side forward, and a single seat—offset to starboard—behind. The engine is one of the new seven-cylinder Siemens Halske air-cooled radials of 80 h.p.

A removable cover for the cockpits may be fitted to this machine.

The main dimensions are tabulated below :



The Heinkel H.E.3 three-seater (80 h.p. Siemens-Halske engine). The machine is shown both as a land machine and as a seaplane.

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Designers and Manufacturers of the Fairey Type III. Series of Machines as supplied in quantity to the British Government during the War and since its termination. In this series of Machines the Fuselage, Centre Plane, Tail Unit, etc., are standard and are adapted to take different types of wings, chassis and engines of other Machines of the series to suit the particular purpose for which the machine is required. All machines of this type have folding wings and are fitted with our patent Variable Camber Gear giving high performance and lifting power combined with low landing speed.

Fournisseurs des Ministères de la Guerre, de la Marina et de l'Air.

Seuls détenteurs du brevet Fairey pour dispositif de cambrure variable pour aéroplanes, hydravions et bateaux volants.

Constructeurs de toutes espèces d'hydravions, bateaux volants, aéroplanes, appareils amphibies avions spécialement aménagés pour levées topographiques et photographiques, hangars flottants et équipement complet pour ces derniers.

Constructeurs, sur commande spéciale du Gouvernement Britannique du plus grand bateau volant construit jusqu'à ce jour.

Etude et entreprise de la fourniture du matériel complet pour services de transport aérien rapide de passagers, postes et marchandises. Constructeurs des Fairey Type III. Série de machines journies en grandes quantités au Gouvernement Britannique pendant la guerre et depuis la cessation des hostilitiés. Dans cette série de machines, le fuselage, le plan central et la queue, etc., sont de type normal, et sont construits de manière à pouvoir recevoir des ailes de types differents, ainsi que des châssis et moteurs d'autres machines de la série, de manière à être appropriés à l'usage auquel la machine est destinée dans chaque cas particuleur. Toutes les machines de cette série ont des ailes démontables et repliables et sont munies de notre dispositif breveté de cambrure variable, qui permet les plus grandes performances et qui combine une grande puissance de soulèvement avec une faible vitesse d'atterrissage.

Proveedores del Almirantazgo, Departamento de Guerra y Ministerio de Aviación Britanicos.

Unicos poseedores de la patente Fairey de dispositivos de combeo variable para aeroplanos, hidroaviones y barcos aéreos.

Diseñadores y constructores de hidroaviones, barcos, aéreos, aeroplanos, aparatos anfibios, de todas clases, tambien de aparatos especialmente adecuados para el levantamiento de cartas topográficas y fotográfias, hangares flotantes y completo equipo para estos mismos.

Diseñadores, por orden especial del Gobierno Británico del barco aéreo más grande que se ha construido para este gobierno.

Proveedores de todo lo necesario para servicios de transporte aéreo de pasajeros, correos y mercancías.

Diseñadores y constructores del tipo Fairey III. Serie de aparatos suministrados en grandes cantidades al Gobierno Británico, durante la guerra y *después de su terminación.* En esta serie de paratos, el fuselage, el plano central y la unidad de la cola, son de tipo normal y fabricados para adaptarse á diferentes tipos de alas, chassis y motores de otros aparatos de series que sean adecuadas para los fines particulares a que se destina el aparato en cada caso. Todas les máquinas de este tipo, tienen alas plegadizas y están provistas del dispositivo patentado de combeo variable Fairey que da una alta capacidad y potencia de ascensión combinada con una velocidad baja de aterrizaje.

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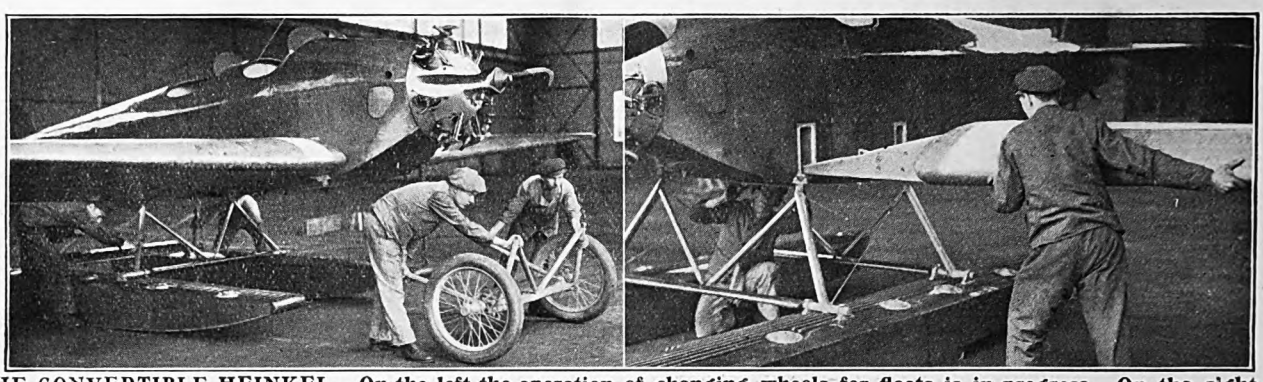
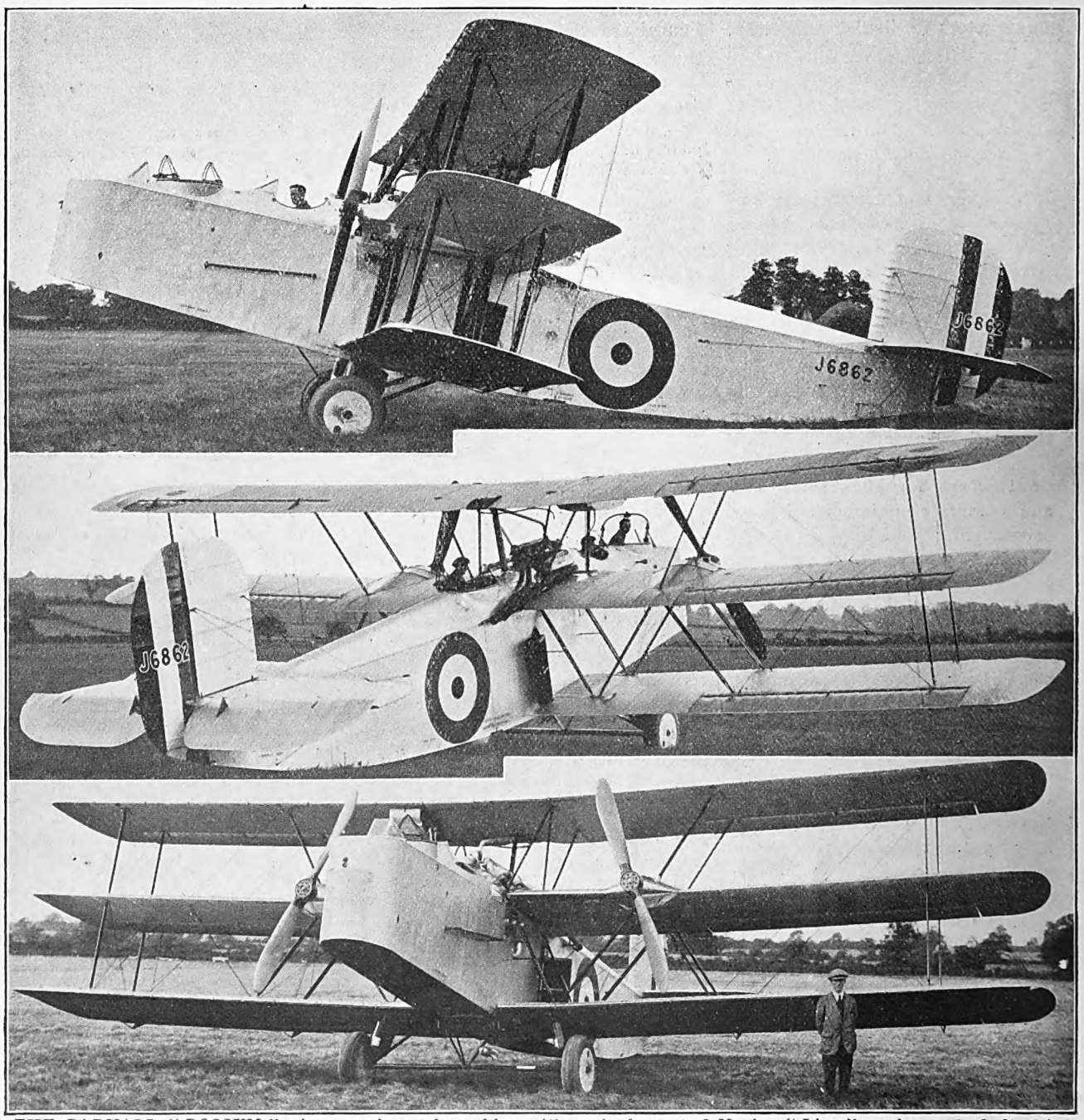


THE CONVERTIBLE HEINKEL.—On the left the operation of changing wheels for floats is in progress. On the right a wing is being attached.

Specification of the Heinkel H.E.3.

	Land machine.	Seaplane.
Span	10.4 m. (34 ft. 1 in.)	10.4 sq. m. (34 ft. 1 in.)
Length	7.8 m. (25 ft. 7in.)	7.8 m. (25 ft. 7 in.)
Wing area	10.4 sq. m. (118 sq. ft.)	10.4 sq. m. (118 sq. ft.)
Height	2.35 m. (7 ft. 8 in.)	2.5 m. (8 ft. 2½ in.)
Weight empty	480 kg. (1,056 lbs.)	520 kg. (1,145 lbs.)
Weight loaded	800 kg. (1,760 lbs.)	840 kg. (1,850 lbs.)
Wing loading	46.5 kg./sq. m. (14.9 lbs./sq. ft.)	49 kg./sq. m. (15.6 lbs./sq. ft.)
Power loading	10 kg./hp. (22 lbs./h.p.)	10.6 kg./h.p. (23.3 lbs./h.p.)
Range	620 km. (380 miles)	600 km. (370 miles)
Speed	150 km.h. (93 m.p.h.)	145 km.h. (90 m.p.h.)
Climb to 1,000 m. (3,280 ft.)	6 mins.	7 mins.



THE PARNALL "POSSUM."—An experimental machine with a single central Napier "Lion" engine and shaft drive to twin airscrews. Intelligent study of the photographs will reveal much which it is not permitted to put into plain type.

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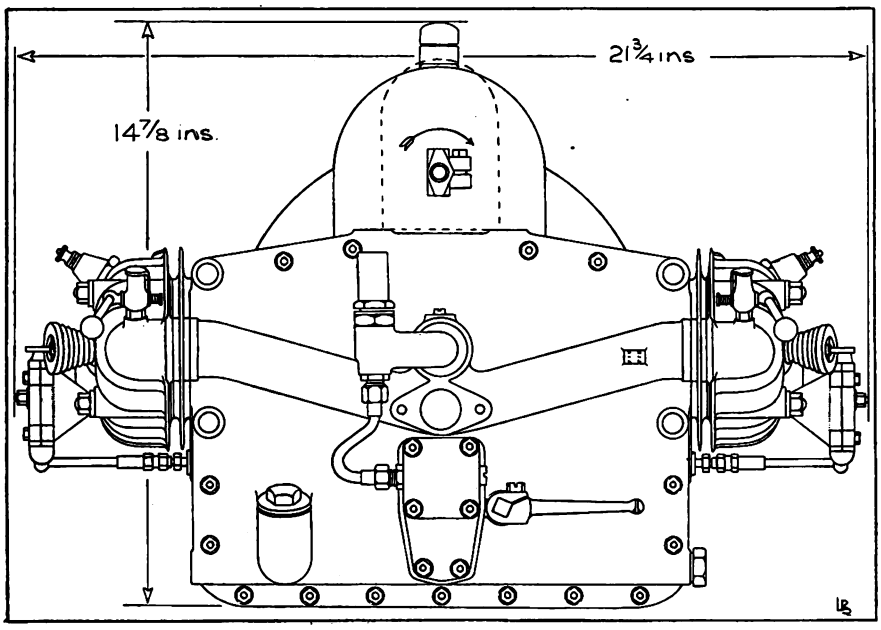
ENGINES FOR LIGHT AEROPLANES.

THE 500 C.C. BRADSHAW.

The 500 c.c. flat twin Bradshaw "oil-cooled" engine, made by James Walmesley & Co. Ltd., of the Marathon Engineering Works, Preston, has shown itself to be a highly-satisfactory motor-cycle power unit, both for solo and side-car machines, and certainly seems to be worthy of trial as a light aeroplane engine.

There appears to be a certain amount of misunderstanding prevalent as to the "oil-cooling" feature of Mr. Granville Bradshaw's latest designs, a fair number of persons being under the impression that the cooling system employed is analogous to the ordinary water-cooling system except that oil replaces water as a cylinder-jacketing medium. If this were the case the air-cooled engine would be practically as heavy as a water-cooled one, and for the work now under consideration such engines would probably be inadmissible.

As a matter of fact the Bradshaw oil-cooling system is really an indirect form of air-cooling. The cylinder walls instead of being exposed directly to the air, are sunk into extensions of the crankcase. Oil is thrown from the crankcase into these extensions and trickles round the cylinder walls proper, maintaining a much more uniform temperature over the whole circumference than is possible in any form of air-cooling and this oil serves merely as a heat carrier, maintaining communication between the cylinder walls and the crankcase. The outer surface of the crankcase acts as the ultimate radiator.



The cylinder-heads are outside of the crankcase extension and these are air-cooled in the ordinary way.

The 500 c.c. engine is of the flat twin type with cylinders 63 mm. bore x 68 mm. stroke. With the exception of the cylinder-heads, the overhead valve-gear and the flywheel, the whole engine is completely contained in the aluminium alloy crankcase casting, which also serves as an oil-sump. The outer surface of this crankcase is singularly clean in outline and is free from crevices in which dirt is liable to accumulate.

The cylinder barrels, which are of fine-grained cast-iron held entirely by flanges at their outer ends, and are of symmetrical cylindrical section throughout with the exception of the flange. They are therefore singularly free from distortion at high temperatures.

The cylinder-head, which is held to the cylinder-barrel flange and to the crankcase by four studs, is of nearly hemispherical form and is fitted with two inclined valves of tulip shape which are made of nickel-chrome steel.

The valves are operated from push-rods through rocker-shafts which are carried in a box containing ample bearings, lubricated by an oil-bath and a wick. The push-rods are perpendicular to the rockers in their mean position, thus giving the minimum of side-thrust on the rocker-bearings.

The camshaft, which is a real camshaft on motor-car lines, is carried across the crankcase below the crankshaft. It is driven by spar wheels and operates the push-rods through rock-fingers. These fingers are pivoted on two parallel shafts geared to each other and to a shaft operated by the valve-lifting lever.

A simple gear-pump is contained in a casing attached to the side of the crankcase and is driven from the end of the camshaft. This draws oil from the sump and through an ample filter, and delivers it to the internally-drilled crankshaft and so to the big-ends. A piston-type oil-pressure indicator is fitted showing that the pump is operating.

This is a very useful feature as the majority of motor-cycle engines are dependent on a hand-pump for their oil supply, and will require to be fitted with a proper lubricating system before they can safely be used on an aeroplane.

The induction-passages of the Bradshaw engine are cast in the crankcase side, and the carburetter is bolted direct to a port on the casing. This secures freedom from petrol condensation troubles, but on the other hand it will restrict freedom of choice for the carburetter position and may make it impossible to arrange a gravity feed.

The magneto is mounted on the top of the crankcase, and is extremely accessible. An outside flywheel of 11-in. diameter is fitted to the standard engine, which is arranged to give two alternative positions for the chain-sprocket.

The engine, without flywheel, magneto or carburetter weighs 49 lbs., and the makers state that this figure can be reduced to 46 lbs. The weight with flywheel, magneto and carburetter is therefore probably about 65-70 lbs.

A power curve of a standard engine (not reproduced) shows an output of 10 h.p. at 2,800 r.p.m. and a maximum of 12 h.p. at 3,600 r.p.m. The makers state that the output can easily be increased to about 14 h.p. at the lower revs. and to a maximum of 18 h.p. by a little tuning.

If an output such as is attainable at about 2,500 r.p.m. is sufficient the engine would probably be used with a direct drive and no flywheel. At higher speeds the flywheel and a chain reduction-gear will be needed. The fuel consumption is given at about .65 pints per h.p. hour.

A general arrangement drawing shows the outward form of this very interesting engine and from this it will be seen that the mounting of the engine by means of the four large bolts just below the cylinder-heads presents no difficulties whatever.

One question however must arise in connection with the use of this engine on an aeroplane. As it depends largely for its cooling on radiation from the crankcase it is possible that any attempt to cowl the crankcase effectively in order to reduce the air resistance may lead to excessive oil-temperatures and therefore this particular point will require careful consideration and possibly some experiment.

THE GNOSSPELIUS LIGHT AEROPLANE.

Since the preliminary trials on Saturday, May 26, the Gnosspelius machine with the 697 c.c. Blackburne engine has been fitted with wheels of larger diameter to allow it to take off and land at a larger angle of incidence than was previously possible.

Further tests were made on Sunday, June 3, at Lympne Aerodrome with very satisfactory results. It is now possible to land at a speed something like 20 m.p.h. less than was previously possible.

On this occasion Mr. Lankester Parker had the machine in the air for nearly 40 minutes, and cruised round at a height in the neighbourhood of 2,500 ft.

A few more trials are to be carried out at Lympne Aerodrome, and it is then one understands to be flown to Martlesham Heath for officially-conducted type tests.

NEW COMPANY.

BRITISH AERIAL ENGINEERING MANUFACTURERS, LTD.—Private Co. Registered May 30. Capital £1,000 in £1 shares. To acquire and exploit the patents now held by G. R. Steward, and to carry on the business indicated by the title. The first directors are:—

G. R. Steward, Buccleuch House, 18A, Valkyrie Road, Westcliff-on-Sea.

Mrs. L. Steward, Buccleuch House, 18A, Valkyrie Road, Westcliff-on-Sea.

The said G. R. Steward shall be managing director for ten years at a commencing salary of £500 per annum. Regd. office:—25 and 26, Lime Street, E.C.3.

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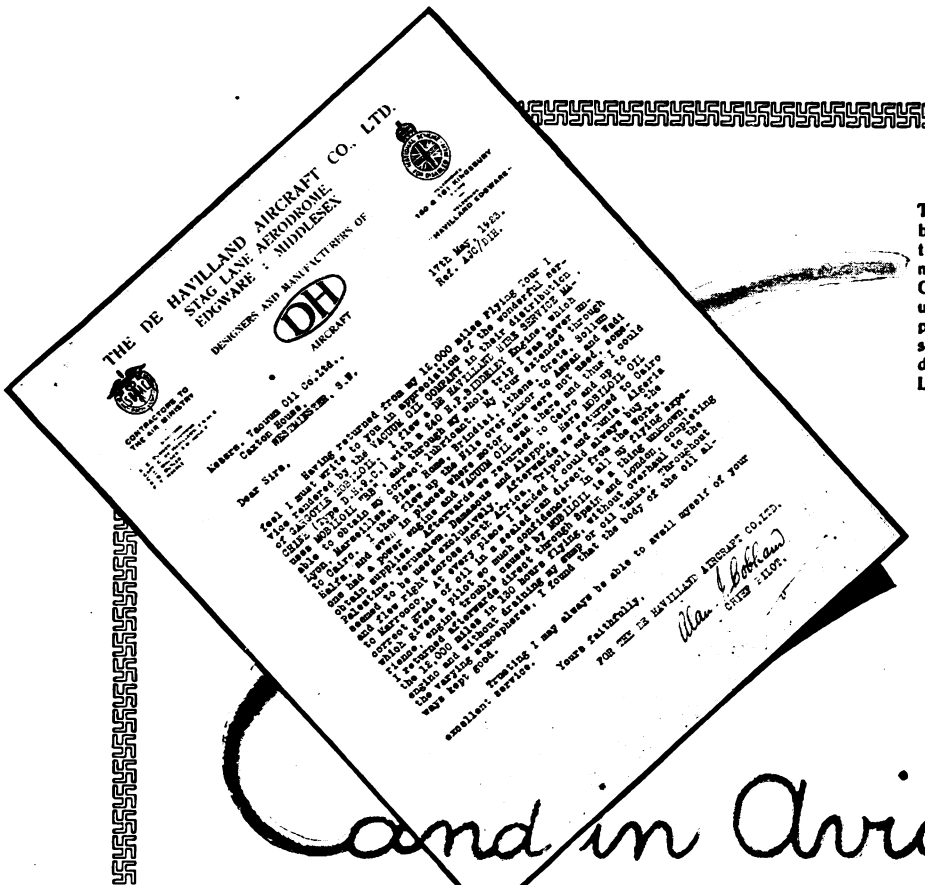
THE DE HAVILLAND AIRCRAFT CO. LTD.
STAG LANE AERODROME
EDGWARE : MIDDLESEX
DESIGNERS AND MANUFACTURERS OF
DH AIRCRAFT

17th May, 1923.

Messrs. Vacuum Oil Co.Ltd.,
Caxton House,
WESTMINSTER, S.W.

Dear Sirs,

I feel I must write to you in appreciation of the wonderful service rendered by your VACUUM OIL COMPANY in their distribution of GARGOYLE MOBILOIL "BB". I flew a 240 H.P. SIDDELEY PUMA engine fitted to my D.H.9 aeroplane, and during the trip, which started from Athens to Cairo and thence to Baghdad, I was astounded to find that the engine, which had run 130 hours without overhaul, was using no more oil than when it left the factory. Throughout the journey, which was through the most trying climatic conditions, the engine functioned perfectly, and I am convinced that the use of GARGOYLE MOBILOIL "BB" was largely responsible for this result.

Yours faithfully,
FOR THE DE HAVILLAND AIRCRAFT CO.LTD.
Alan J. Cobham
CHIEF PILOT.

The original letter, signed by Mr. Alan J. Cobham, the famous civilian pilot, may be seen at our Head Office. It was entirely unsolicited and is a complete endorsement of the satisfaction and world-wide distribution of Correct Lubrication.

Gargoyle Mobiloil and in Aviation

1909—Gargoyle Mobiloil "A" used by Wilbur Wright at Pau in all his flights and proved entirely satisfactory.

1914—Gargoyle Mobiloil "BB" ensured Correct Lubrication for "Green" Engine which won first prize—Naval and Military Aeroplane Engine Competition—£5,000.

1918—Gargoyle Mobiloil (10,000,000 gallons) used by R.F.C., R.N.A.S., R.A.F. and transport services in France during the War.

1923—Gargoyle Mobiloil "BB" correctly lubricated 240 H.P. Siddeley-Puma 12,000 miles, 130 flying hours, without overhauling engine or draining sump.

Always insist on Gargoyle Mobiloil. Correct grade and same quality obtainable the world over.

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FENCING: Foil v. Foil, R A.F. (Officers), 1, Wing/Cmdr. L. W. B. Rees, V.C.; 2, P/O. G Goffin; 3, F/O. G C. O'Donnell. (Other ranks) 1, S/M. W. Reid; 2, S/M. R. E. Gorwood; 3, Crawley.

Inter-Services Championship: 1, F/Lt Sherriff, R.A.F.; 2, Lt. C. A. Kershaw, R.N.; 3, C. P. O. Hewson R,.N.

Epée v. Epée (Officers), 1, F/O. F. C. Chalmers; 2, F/O. R. A. Vosper; 3, F/O. Titmas. Epée v. Epée (other ranks), R.A.F., 1, Cpl. Crawley; 2. S/M. W. Reid; 3, S/M. R E. Gorwood.

Epée v. Epée Inter-Services Championship, 1, C.S.M.I. Wyatt, Army Physical Training School; 2, F/Lt. Sherriff, R.A.F.; 3, Col. Henslow, Wiltshire Regt.; best style prize, F/Lt. Sherriff.

Bayonet v. Bayonet (Officers), 1, F/Lt. E. E. Porter; 2, F/O. C. C. Musslewhite; 3, F/O. R. A. Vosper. (Other ranks) 1, S/M. W. Reid; 2, F/St. Barber; 3, Sjt. Higgott.

Inter-Services Championship, 1, F/Lt F. O. Sherriff, R.A.F.; 2, CP/O. Howson, R.M.; 3, QM/S. I Hawes, R.M.L.I.; 4, Capt. Brock.

TUG OF WAR (130 stone): R.A.F. Championship Final: R.A.F. Cadet College, Cranwell, beat R.A.F., Farnborough, by two pulls to nil.

TUG-OF-WAR (130 stone): Inter-Services Championship: Royal Naval Barracks, Portsmouth, beat R.A.F. Cadet College, Cranwell, by two pulls to nil.

TUG-OF-WAR (110 stone): R.A.F. Championship: Final, R.A.F. Base-Gosport, beat Electrical and Wireless School, R.A.F., by two pulls to nil.

TUG-OF-WAR (110 stone): Inter-Services Championship: Royal Marine Artillery, Portsmouth, beat R.A.F. Base, Gosport, by two pulls to nil.

The R.A.F. Lawn Tennis Association.

R.A.F. v. Queen's Club.—The second match of the season was played on June 9, resulting in a win for Queen's Club by 6 matches to 3.

Results: F/Lt. J. Duminy and F/O. W. B. Stott lost to P. M. Davson and N. Heath, 3—6, 4—6; lost to Dr. D. Browne and C. Goodall, 2—6, 5—7; beat R. J. McNair and T. R Quill, 6—3, 6—3. S/Ldr. H. J. F. Hunter and F/Lt. V. E. Lindop, lost to Davson and Heath, 3—6, 4—6; beat Browne and Goodall, 6—3, 1—6, 6—3; beat McNair and Quill, 6—3, 6—3; F/Lt. J. V. Hirst and F/Lt. J. S. Smith lost to Davson and Heath, 2—6, 3—6; lost to Browne and Goodall, 1—6, 1—6; lost to McNair and Quill, 6—4, 3—4, 0—6.

Association Football.

The last Match of the season in the Middle East was played on Apr. 30 and resulted as follows: Aircraft Depot 2, Stores Depot 0.

R.A.F. Constantinople.

ATHLETIC SPORTS RESULTS.

Cross Country. (6 miles.) Teams of 12. First 8 in each team to count points.—No. 207 Squadron.

3 Miles. 16 mins. 50 2/5th secs.—1st, AC.2. Hill (H.Q.), 2nd AC.1. Brenchley (25 Sqdn.), 3rd F/Lt. J. P Coleman, A.F.C. (208 Sqdn.).

1 Mile. 5 mins. 2/5th secs.—1st AC.1. Crofts (25 Sqdn.), 2nd AC.2. Hill (H.Q.), 3rd Cpl. Bradshaw (4 Sqdn.).

880 Yards. 2 mins. 17 secs—1st AC.1. Hughes (25 Sqdn.), 2nd AC.1. Crofts (25 Sqdn.), 3rd Sgt. Stone (4 Sqdn.) 440 Yards. 58 1/5th secs.—1st F/O C. E Maitland (25 Sqdn.), 2nd AC.1. Spencer (4 Sqdn.), 3rd L/AC. Bowskill (S.P.). 220 Yards. 25 1/5ses.—1st F/O. H. G. Rowe (207 Sqdn.), 2nd L/AC. Wootton (25 Sqdn.), 3rd AC.1. Spencer (4 Sqdn.). 100 Yards, 11 1/5th secs.—1st L/AC. Wootton (25 Sqdn.), 2nd F/O. H. G. Rowe (207 Sqdn.), 3rd F/O. C E. Maitland (25 Sqdn.).

120 Yards Hurdles. 21 2/5 secs.—1st F/O. H. G. Rowe (207 Sqdn.), 2nd AC.1. Jeffery (4 Sqdn.). High Jump. 5 ft. 2 ins.—Tie, F/O. Gibbons, D.F.C. (25 Sqdn.), and AC.2 Price (207 Sqdn.), 3rd AC.2. Walker (4 Sqdn.). Long Jump 18 ft. 5 ins.—1st F/O. H. G. Rowe (207 Sqdn.), Tie, AC.2 Price (207 Sqdn.) and Corpl. McFarlane (4 Sqdn.).

1 Mile Relay. 4 mins 14 3/5th secs.—Ist No. 25 Sqdn., 2nd No. 207 Sqdn.

Officers' Tug-of-War. (Teams of 8 catchweight.).—1st No. 4 Sqdn., 2nd No. 25 Sqdn. Airmen's Tug-o'-War. (Teams of 8 catchweight).—1st No. 4 Sqdn., 2nd No. 207 Sqdn.

Open One Mile Relay Race. (For H.M. Ships. and Units of the British Forces in Turkey.) 3 mins. 49 secs.—Winners, 1st Battn. Gordon Highlanders, Second, King's Own Scottish Borderers.

Points for the Inter-unit Challenge Cup—No. 25 Sqdn., 43; No. 207 Sqdn., 36½; No. 4 Sqdn., 28½; Headquarters, 6; No. 208 Sqdn., 1; Stores Park, 1.

R.A.F., Mediterranean.

1. R.A.F., UNIT H.M.S. *Pegasus*: Association Football.—Games played during the month were as follows: 7.4.23, H.M.S. *Pegasus* team (including F/Sjt. Moore and Sjts. Owen and Gardiner, R.A.F.) versus H.M.S. *Cardiff*, in 2nd Division of Light Cruiser League—Lost 1—3. The ship's position in this league is 3rd, having played 6 matches, of which 4 were won and two lost.

NOTE:—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*

A NOTABLE COLLECTION.

One of the attractions of the Congress week to those who are more deeply concerned with aeronautical affairs will be the sale on June 29 by Messrs. Hodgson & Company, of 115, Chancery Lane, of the very valuable collection of aeronautical books and engravings made during the past twenty years or more by Major Baden Powell, F.R.A.S., F.R.Met.S., formerly President of the Royal Aeronautical Society. If space permitted one could easily fill pages of THE AEROPLANE with comparatively brief notes on the aeronautical literary curiosities included in this collection. As it is one can only mention very shortly a few of the genuine curiosities which appear in the collection.

There is for example Francesco Lana's famous book in which appeared the first description of a "flying-boat," from which the Felixstowe boats were *not* derived. There are two copies of Vincento Lunardi's account of the first aerial voyage in England and various accounts of his other voyages. There is a copy of the very rare original edition of Walker's Treatise on the Art of Flying by Mechanical Means, and also one of George Pocock's "The Aeropleustic Art."

Those who have intentions of writing an exhaustive history of aeronautics will be particularly interested in an extensive collection of cuttings from newspapers, magazines and books relating to the development of aeronautics in general. There are over 1,700 of these together with engravings, wood-cuts and portraits. They are arranged in fifteen portfolios and cover dates between 1783 and 1911. There are also five portfolios and a parcel of loose cuttings still to be arranged. These should provide in themselves an absolute reference library to the history of aeronautics apart from the purely technical developments.

The works of all the aerial aeronauts and aviators such as Glaisher, Bacon, Santos-Dumont, Langley, Lilienthal, Eiffel, Griffith Brewer, Maxim and so forth naturally appear in the collection. As a matter of fact the whole collection ought to be bought by the Royal Aeronautical Society of the Royal Aero Club so as to preserve it intact and one would like to make the suggestion that some of the newer comers to aeronautics would be doing a graceful act if they were to purchase the collection and present it to one or other of these associations. One suggests "the newer comers" because with very few exceptions the old-timers have spent in aviation the only money they ever had.

KING'S CUP ENTRIES.

A large entry is certain for the race for the King's Cup which starts from Hendon on July 13. The de Havilland Aircraft Company are catering for the stage. Mr. Alan J. Cobham the famous and indefatigable etc., etc., is flying a D.H.9a with Napier "Lion" engine entered by Mr. George Robey and Mr. Hubert Broad is flying a D.H.9 entered by Mr. Harry Tate.

One suggests that the pilots should be made up to resemble their entrants. Mr. Cobham has just the eyebrows for the part though one hopes that he will not follow his entrant and go "round in 50." While this would be an excellent effort in the open golf championship now in progress at Troon, it would probably deprive Mr. Robey of any chance in the King's Cup Race. It seems a pity that Mr. Tate could not have obtained a specimen of the famous aeroplane which was named and designed after him, the R.E.8. While this will be an excellent method of publicity (though of course not so good as entering Parliament) for the artists concerned it is at the same time a very good idea and exactly what the Editor of THE AEROPLANE advocated soon after the war when discoursing on sporting flying. It is to be hoped that other members of "*the* profession" and other minor professions will follow suit. What about a joint entry from the "R.A.F.'s own" as the Co-Optimists are styled? It would be splendid advertisement as the course is sure to cross theirs at times. One commends the idea to Mr. Clifford Whitley.

The Aircraft Disposal Company are also preparing a D.H.9a with a Napier engine. They got out drawings for a Tinsyde with a Napier but owing to pressure of work they may not have time to complete it.—G. D.

COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 21; Tuesday, 20; Wednesday, 19, Thursday, 19; Friday, 19; Saturday, 6; Sunday, 2.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 20*, passengers 138, freight 6,068 lbs.; Air Union, machines 19†, passengers 33, freight, 16,341 lbs.; Total machines 39, passengers 171.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 21*, passengers 71, freight —.

MANCHESTER—LONDON—AMSTERDAM—BERLIN:

Daimler Airway, machines 28, passengers 75, freight —.

BERLIN—LONDON:

Aero-Lloyd, machines 2, passengers 2.

LONDON—ROTTERDAM:

K.L.M., machines 13, passengers 9, freight —.

SPECIAL MACHINES:

De Havilland Hire Service, machines 1, passengers 1.

Surrey Flying Services, machines 2, passengers 1.

Armstrong Whitworth, Ltd., machines 1, passengers 0.

Total number of trips by British machines: 73, carrying 286 pas. Foreign machines: 33, carrying 59 pas.

STATISTICS.

For week ending June 10:—

Machines, 106; Passengers, 345; Crews, 171; Total Personnel, 516.

Corresponding week last year:—

Machines, 134; Passengers, 258; Crews, 175; Total Personnel, 433.

Corresponding week, 1921:—

Machines 97; Passengers, 299; Crews, 111; Total Personnel, 410.

Corresponding week, 1920:—

Machines 93; Passengers, 188; Crews, 107; Personnel, 295.

* These machines also carry loads of freight.

† Some machines are freighters only.

Croydon Notes.

There has been an increase of nearly 100 passengers on the air route this past week which is very satisfactory.

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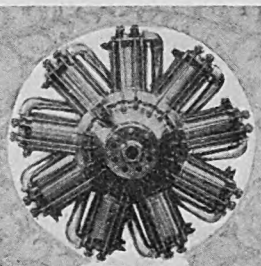
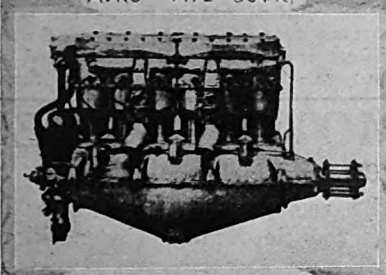
BRITISH ADC LIMITED AIRCRAFT

A SELECTION FROM OUR STOCK.

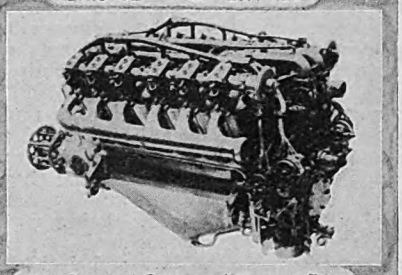
AVRO TYPE 504 K.


200 h.p. B.R.2

BRISTOL FIGHTER. F.2B.


230 h.p. SIDDELEY "PUMA".

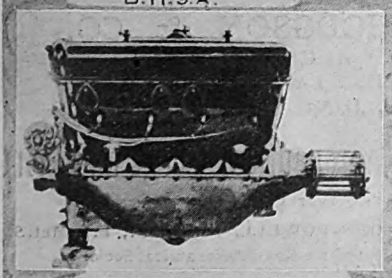
D. H. 9.


360 h.p. ROLLS-ROYCE "EAGLE" VIII

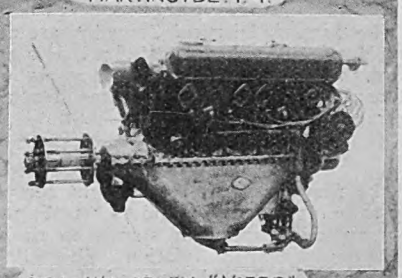
D.H.9.A.

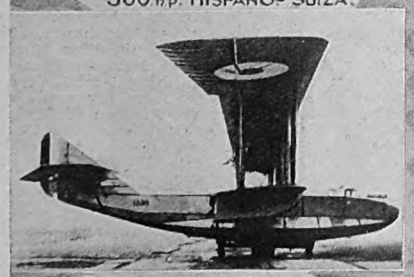
100 h.p. MONOSOUPAPE

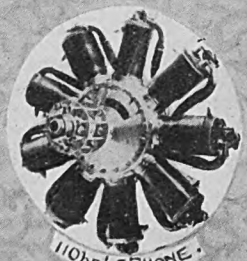
MARTINSYDE. F.4.


300 h.p. HISPANO-SUIZA.

S.E.5.A.


210 h.p. WOLSELEY "VIPER".


F.3. FLYING BOAT.


110 h.p. LE RHONE.

PARNALL PANTHER.

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REGENT HOUSE,

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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

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There is a considerable improvement in the number of passengers using the London-Manchester line. This is possibly the result of the Daimler Airway threatening to transfer the service to Liverpool. The Berlin service is also improving and both the Daimler Airway and the Aero-Lloyd are each putting on an extra service per week in each direction.

Mr. Robinson has now left the Instone Air Line who will now require another pilot to bring them up to their strength of six in accordance with the subsidy regulations.

Mr. Cyril Holmes did a fast trip to Cologne on Friday on D.H.34 (Napier engine) G-EBBV with four passengers and about 600 lbs. of goods in two hours and fifty minutes.

On Wednesday Mr. Donald Robins flew the Vickers "Vulcan" over the horse Derby at Epsom. He had with him representatives of the police who were doing "art obs" for the traffic controlling authorities with the aid of wireless. This avuncular assistance caused a wonderful freedom from traffic jambs.

Mr. Walters, the new addition to the Handley Page group of pilots, made his first trip as pilot on the Paris route on Thursday. He left Croydon at 12.11 hours on Thursday on "Beer George" with 11 passengers and reached Paris at 14.47 hours. He left Paris again at 15.54 with 4 passengers and reached Croydon at 18.49 hours.

As an ensample of business-like methods of a firm W. & T. Avery Ltd. the leading makers of automatic weighing machines deserve the highest praise. The management desired a business conference in Paris but it was difficult to arrange a suitable time without undue interference with normal routine. A member of the firm, Major G. H. Jackson, late of the R.A.F., and still thinking brightly, suggested that they should not take their pleasures sadly but should arrange to fly to Paris on Saturday and return on Sunday having conferred. Being used to weighing things and situations accurately and quickly, the officials of the company leapt at the idea and decided to go and take their friends with them.

Therefore by arrangement with Handley Page Transport Ltd., two machines will leave Croydon at 09.00 hours on Saturday 23rd and will leave Le Bourget the following day at 16.00 hours.

Mr. Gilbert C. Vyle, the Managing Director, other Directors, Area Managers, Sales Managers, etc., will all make the trip and the whole of the available 28 seats will be occupied by the firm. One hopes that this enterprise will not escape the notice of the Air Conference. And one hopes that weather or other considerations may not hamper or prevent success and that they will not lose their balances.

On Friday last Mr. Frank Courtney returned from Spain on the Armstrong-Whitworth "Siskin." In spite of the head wind, he only took two hours seven minutes.

The Aircraft Disposal Company are very busy in the sheds. On Monday Mr. Perry tested a D.H.9 and on Thursday Capt. Rex Stocken arrived from Brussels on the demonstration Renault-Avro. On Friday he was demonstrating a "Tinsyde" before a foreign delegation.—G. D.

PIONEERS AGAIN.

The first machine of the light aeroplane class, misnamed by the vulgar "motor-gliders," to be put on the market as a commercial proposition stands to the credit of two of the pioneers of British Aviation. Short Bros. Ltd. intimate that arrangements have been made between that firm and Major Gnosspelius for the marketing of the "Gull" light aeroplane, commonly known as the "Gnosspelicopter," fitted with the 700 c.c. Blackburne engine. The firm are now open to receive orders for delivery in time for the September Competitions.

Completed machines can be given in nine weeks from date of order, so that it will be necessary for anyone intending entering one of these machines for these competitions to place their orders at an early date. Short. Bros. will welcome inquiries and send particulars to anyone interested. It is fitting that this new departure should be made by Mr. Oswald Short, who was one of the pioneers of 1908, with his henchmen Mr. Parker (R.N. Air Service of 1912) and Major Sippe (Brooklands 1911), on the one hand and Major Gnosspelius (Windmere 1911) on the other. May success attend their latest enterprise.

AN ERROR IN TRANSMISSION.

Owing to an error in transmission it was made to appear recently that the Chief Designer of the Aircraft Disposal Company is a Mr. Chatworthy. The reference should have been to Mr. J. Kenworthy, who is chiefly famous for having produced the Austin "Whippet" of 1919, a machine which was in many ways years in advance of its time. It was a low-powered sporting machine with good speed built chiefly of steel and intended to be maintained by an owner-driver in an ordinary motor garage. It was in fact a rather large size forerunner of the light aeroplane which is generally regarded as the sportsman's mount of the near future. Mr. Kenworthy also produced the Austin "Greyhound" and "Kestrel," the latter of which put up a very good performance in the Government trials of 1920. Prior to that Mr. Kenworthy had been Chief Designer at the Royal Aircraft Factory where necessarily he learnt quite a lot about how not to do things. His work at the Aircraft Disposal Company will be watched with interest, and it may be well here to recall that he wants assistants.

BRIGHTER BRIGHTON.

People concerned with aviation will be interested to know that the Brighton Carnival, which is now recognised as almost a national affair, has been organised this year by Mr. Herman Volk who was well-known to the aircraft trade during the War firstly as Manager of Sage's Aircraft Works at Peterborough and later of the Gosport Aviation Company. Mr. Volk has a better right to fame in that he established the first Seaplane Station in England when he set up a portable hangar of his own design and construction at the terminus of his well-known electric railway at Brighton. It was from that station that Mr. Glenn Curtiss operated the first flying-boat which ever came to this country.

Mr. Volk is to be congratulated on his success in organising the Brighton show. So far as the actual attractions are concerned the much-boomed Carnival at Nice has nothing on it—to adopt the American phrase—and so far as the actual organisation of the various processions, battles of flowers, decorated car competitions and so forth are concerned the Brighton show can give points to anything on the Continent.

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ON SEIZING AN OPPORTUNITY.

"Opportunity is everything," is a very old saying. And its corollary "Chance is nothing" is equally true. Also Shakespeare has said "There is a tide in the affairs of men which taken at the flood leads on to fortune." Furthermore there is a moment at which to plunge into that tide and seize the opportunity.—It is commonly and erroneously called *the psychological moment,* but of that more later. Here and now, within the next four or five weeks, is the great opportunity of the Air Ministry. If the Ministry "goes in off the deep end"—as the current phrase has it—we shall have the greatest Air Force in the World and we shall retain the Command of the Air which we won in the War 1914-18. If the Ministry goes on dabbling its toes on the brink it will find the tide receding and itself left high and dry with just about as little Air Force as it has to-day.

The position is simply this :—In the Air Estimates 1923-24, £3,600,000 is allocated for the purchase of aeroplanes with spares and engines with spares. Now, if all that money is not paid out by March 31, 1924, the unspent balance goes back to the Treasury. And if any of it goes back the Air Ministry will have lost its opportunity.

To-day the feeling of the Nation and of its representatives in Parliament is all in favour of a big Air Force and it is recognised that the Air Force is our First Line of Defence. The Press, for once in a while, not only represents public opinion, which is generally wrong, but happens to be for once on the right side. The House of Commons to-day is in a humour to vote Supplementary Estimates if the Air Ministry spends too much. It will be a horrible anti-climax and there will be a dangerous revulsion of feeling if the Air Ministry spends too little and has to return some of the money already voted.

Psychological Momentum.

This is where "the psychological moment" enters into calculations. The phrase is good German. It was popularised by a German despatch during the Siege of Paris, when German G.H.Q. mentioned the "psychologischer moment" of the Parisian populace,—using the word exactly as we use it in talking of a "moment of inertia." It has to do with the mental (or psychological) momentum of the crowd and has nothing to do with a moment of time.

To-day the psychological moment in the Country and in Parliament is such that it will swing the Air Ministry well over the point of maximum expenditure set forth in the Estimates. But if the Air Ministry under-spends and has to commit the banality of giving back money which already belongs to it we shall have our precious moment working on the opposite swing of the pendulum and the Air Ministry, having lost popular support, will find itself not merely having to give back money to the Treasury but having to give back the R.N.A.S. to the Navy and the R.F.C. to the Army.

Those accustomed to official ways may ask how the Air Ministry is to spend its money in a hurry, considering that every penny spent has to receive Treasury consent even after it is voted. The reply is that the Air Ministry should do what the ex-First Line of Defence has done hitherto, namely spend the money first and afterwards ask for consent to spend it. When the Navy wanted guns or ships it ordered them and when they were built or building asked for the money to pay for them, and it always got the money.

No Government is going to cashier an officer or dismiss an official who can stand up boldly and say "My job is to provide you with adequate defence. Now you have got it. And you must pay for it." Still less is there going to be any trouble about spending money which has already been allocated for a set purpose with the good will of the Nation behind it.

Hustling Expenditure.

The Air Ministry's real difficulty will be to spend the money in the remaining eight months of the financial year without wasting it. And that is the point to which this discourse is directed.

The Air Ministry argument seems to be something like this :—It is no use having machines and engines unless we have pilots to fly them and mechanics to maintain them. We cannot have the pilots and mechanics till they have been properly trained. And we cannot train the pilots and mechanics till we have proper quarters and barracks in which to house them.

Now that is a perfectly sound argument for building up a big Air Force on a solid foundation of bricks and mortar provided that the Ministry is certain of getting the necessary money for more personnel when the barracks are built and for more machines when the personnel are trained. But it leaves out of account the immediate great opportunity and the psychological moment

Nobody who knows all the circumstances, least of all the Aircraft Industry itself, feels any grievance against the Air Ministry or any member of the Air Council. All one wishes to do is to make a few suggestions which if they cannot be adopted may at any rate indicate new lines of thought which can be followed to beneficial ends.

Difficulties of Production.

First of all there is the matter of spending the £3,600,000 which is allocated for aeroplanes and engines. Let it be remembered that such a sum represents roughly an expenditure of something like £100,000 *per week* from now till the end of the Financial Year, for up to the present practically no machines have been delivered and paid for on this year's account.

Let it be remembered also that though a few firms in the Aircraft Industry are fairly busy none of them have their factories full of men working at full capacity. And no firms have in hand sufficient orders to keep them going till the end of the financial year with absolute certainty.

If the whole of the £3,600,000 were allocated to-morrow in orders according to the various capacities of the different firms which go to make up the Aircraft Industry it would still be a matter of six weeks or two months before every factory could be in full blast on a quantity-production basis. And the production orders to absorb three million pounds will not be placed to-morrow, or next week, or even next month.

First of all the drawing offices will have to get out workshop drawings. Then patterns and jigs and tools will have to be made. Meantime the fitting-shops, machine-shops and wood-working shops and finishing shops and assembling shops will be standing idle. Then when the metal and wood-working shops are started there will still be no work for finishers and assemblers. And men will have to be found to fill all these empty shops.

It will at least be October next before the first deliveries of machines and engines in series begin to come out of the works. And that means that practically the whole of the orders, at any rate three millions of pounds worth of them, will have to be rushed out in less than five months.

The longer the delay in placing the orders the less chance there is of getting the machines delivered by March 31, 1924. And unless a machine is actually delivered by that date the Government will not pay for it out of this year's Vote. And its price will have to be paid back to the Treasury as a "carry-over" to the next financial year. Surely it is better that this money should be spent at once on wages in producing material for our defence than that it should be spent in doles to unemployed mechanics and other workpeople.

Accelerating Deliveries.

Thus it may be seen that the actual placing of orders is of considerable urgency. The Trade is not yet busy. It is necessary to build up the firms now, while the money is available. The next financial year may be too late. Let us get going now while Parliament is in the mood to back the Royal Air Force.

Hence there arises the need for accelerating deliveries when orders have actually been placed. Everybody in the Aircraft Industry knows that appalling delays are caused in factories by holding up machines for the fitting and adjusting of Air Ministry gadgets which have nothing to do with the construction of the machine itself. Aeroplanes which are completely finished are left sitting in the finishing-shop blocking the progress of subsequent machines while minor officials fiddle with the fitting of bomb-sights, comic petrol joints, turn indicators, and all sorts of instruments and odd things.

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY, JUNE 30.

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All this ought to be done outside at the R.A.F. Depots and Parks. When an aeroplane is finished as an aeroplane it should be delivered and payment should be made for it. Then the Air Ministry experts could play with it at their leisure, with R.A.F. mechanics. It is nothing unusual for a finished machine to spend more time on the factory floor while officials adjust it before leaving than it takes in being assembled from its component parts into a finished product. And when it goes to a Service squadron most of these time-wasting gadgets are removed and piled in a corner of the shed.

One suggests that the Supply Department's motto should be, "Never mind the gadgets. Get the Machine." This is the time for action not for perfection if the R.A.F. is to have value for the money which has been voted to it and if it is not to re-fund most of its allocation to the Treasury in April, 1924

Increasing Personnel.

Given the machines, which can be got if prompt action be taken on the lines indicated, there then arises the question of pilots and mechanics. Let us consider the latter first, as they are necessary to the maintenance of the machines.

Let us remember that we have in this country the finest mechanics in the World. The German is assiduous but lacks initiative. The Frenchman is enthusiastic but sloppy and careless in his methods. The American is either a tool-shop artist or a mere machine-minder. The Englishman when well trained and inspired is the real artist-artisan.

Those artist-artisans can be got for the R.A.F. if it is made worth their while to join. If necessary let the R.A.F. give them special rank and pay and less drill and duty, something like the Engine Room Artificers in the Navy, with prospects of rapid promotion. The highly-skilled mechanic is frequently on a higher educational and mental plane than is the pilot or observer officer. And this fact should be recognised.

Then there is said to be difficulty in getting pilots. Surely there is no lack of material. Our Public Schools are full of youngsters bursting with the daring energy of Nordic Man, the only race that counts. They can be lured into the R.A.F. by suitable pay and position. If necessary give them extra flying pay, but get them.

One hears that the candidates for Cranwell this month are more numerous and of better class than ever before. This shows that the feeling among the best people is trending at last towards the R.A.F. Let us then get the elder brothers of the new Cranwell people to come in with Short Service Commissions, and make it worth their while. The Air Ministry can over-spend on the cost of personnel just as well as on matériel if it seizes its opportunity.

There is of course the difficulty of housing the men and machines of a suddenly-increased R.A.F. One submits that there are still quantities of unoccupied huts and sheds on disused aerodromes all over the country which might easily be re-occupied and made habitable without vast expense. And in any case Parliament will sanction the expense even if the Treasury disapproves.

Non-Political Minds.

The chief trouble about all this suggested rapid expansion seems to be that the Staff of the R.A.F. is not sufficiently politically-minded. This, be it understood, is a compliment. For if we had a permanent and reliable Government we could rely on the Staff to build up our Greater Air Force on a solid foundation progressing from bricks and mortar to personnel and so to matériel. But this immediate to-day is the instant for political action.

The political atmosphere is right for instant action. Not long ago Mr. Lambert, a Labour M.P. asked whether we were getting the defence needed out of the £129,000,000 which we are spending on Imperial Defence—£50,000,000 and more on the Navy, something less on the Army, and a mere £29,000,000 on our First Line Defence, the Air Force. That shows that sane Labour, as opposed to the Bolshevik elements, is as keen on adequate defence as is the most hardened Tory.

The House expects results for the Defence Votes. The last result it wants is a carry-over to next year of the money voted for Defence. This Parliament is the turning-point in the history of the Air Force. It will be easy to get a Supplementary Vote if we over-spend on Air Defence, but if we carry-over the House will lose confidence in the fitness of the Air Ministry to estimate for its own expenditure. And then the Navy will get more money next year instead of less.

Superiority to Circumstances.

If the foundations to the Air Force are not big enough, then let us use such foundations as we have got. Or at least let us spend all the money we can get on material to be set aside for the time being and erected on the bigger foundations which are still being laid. Another Government may be against us. Our opportunity is now.

Recently some political person said, "We cannot have a big Air Force because we are not a conscript country," meaning that we cannot conscript trained mechanics as can France and Germany. That is pure nonsense. We can get our mechanics if we pay them well enough and make it worth their while to join. The man who said that was looking at difficulties not at opportunities. To seize an opportunity it is necessary to be above mere circumstances.

As one has said before, nobody is grumbling at what the Air Ministry has done or has not done. The Air Member for Supply and Research, Sir Geoffrey Salmond, has done excellently in the matter of material. And he has shown a quick grasp of technical problems. No country can show such an array of new and progressive aeroplanes as he has produced during his short period in office, and these new types are now ready for quantity-production. The Chief of the Air Staff, Sir Hugh Trenchard, has entirely reconstructed the personnel of the R.A.F. and has laid down the organisation for rapid expansion of permanent squadrons and reserves on lines which will absorb everybody and everything the Air Council can give him for his Greater Air Force.

All concerned with Aviation have done their best to influence public opinion in the right direction and now the time is ripe for immediate action.

The next two or three weeks will be full of Aviation events. The Air Congress and the R.A.F. Pageant will concentrate public attention on air affairs. Now is the time to act. If the Air Council, as suggested, goes in off the deep end it will make such a splash that the other Services will be drowned in the spray. If it does not, then we shall lose our opportunity. And a scared opportunity goes and never comes back any more.—C. G. G.

ON MONGOLS AND THINGS.—(II.)

["On Secret Patrol in High Asia" by L. V. S. Blacker (Captain, "The Guides"), 301 + XI pp. John Murray. 18s.]

The worst of attempting to review such a book as this is that if one quotes anything one wants to quote the lot. Therefore one proposes by the exercise of great self-control to quote just a few passages which will it is hoped give one's readers some idea of the author's quaint and fascinating phases of style. He does not mix his style, he changes over from one phase to another according to the gravity or otherwise of his subject. But whether he is grave or gay or utterly hilarious it is impossible to stop reading him.

The situation of the peaceful mission in Tashkend was complicated by an irruption of Punjab infantry and some few Indian cavalry into the South of Turkestan. As Blacker says "The Soviet, by no means a highly-educated or enlightened coterie accepted this information" (that the Punjabis were mercenaries hired by the enemies of the Bolsheviks), "but with some misgivings, since their imagination boggled at the idea of a British Mission coming to an enemy capital in the same week that a British army invaded the country, as well it might."

The aforesaid Punjabis, having defeated the army of the Turkestan Soviet many times, "In haste they sent for their crack corps, the Zhlobinski Polk. This engaging unit, some 3,000 to 4,000 strong, had been . . . . fighting against the Orenburg Cossacks, now temporarily quiescent. They were mainly composed of ex-convicts, *forçats* who had been transported to Sakhlien, the Cayenne of Imperial Russia, and had been released by the revolutionaries. Even amongst others of the Red Army, who were by no means Little Lord Fauntleroys, they were conspicuous for a cut-throat ruffianly swashbuckling. Their commander, Ginsburg, was one of the very few Hebrews who ever went under fire, and he possessed, alone, some occult influence over them."

Here is a delightful picture of one of this crowd :—"One of the Zhlobinskis, thinking himself aggrieved in some small matter, decided to call upon the War Minister to obtain satisfaction. He took with him a bellyful of vodka to lend him eloquence, and a stick-grenade to emphasise his arguments. Clambering up the steep stairs of the office, he found the Secretary of State 'not at home,' whereupon a chorus of clerks and typists, quiet understandably, projected him down again onto the hard unfeeling pavement. When the broad cobbled, poplar-lined avenue had ceased revolving and he had cooled his heated brow against the slender white trunks, he found the grenade still in his hand, and an unoffending aborigine messing about in the middle of the thoroughfare in front of him. Withdrawing the pin he decided not to waste the bomb so he hurled it at the scavenger. The bomb burst, and the stick coming back with poetic justice killed the Zhlobinski, the native remaining unscratched."

The fate of the Zhlobinskis was just. "At long last they reached the south-west front, in time to be cut to pieces by the Punjabis at Kaakha. The regiment ceased to exist and their commander died of his wounds."

Writing of Sirul, the police commissar at Tashkend, Blacker says :—"The ex-baker, for such he was, had a sinister side to him. One evening half-a-dozen commissars of ad-

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verse political views were supping in the restaurant of our hotel. Without the least warning a dozen Red ragamuffins leapt on them with fixed bayonets, killed a couple on the spot, and dragged the survivors away to the police headquarters, where Sirul had them despatched messily amongst the typewriters and electric fans of his tidy inner office. This rather stamped the man: anyone but a roturier would have done it in the garden."

The Way Home.

How Sir George Macartney ultimately compelled the President of the Turkestan Soviet Republic to provide a special train for the British Mission back towards Kashgar is a delightful story. As the author says:—"To the onlooker, it was a wonderful sight to see the mastering, by the gentleman of a superior race, of the unwashed chosen of the proletariat, against their own desires."

The descriptions of the uniform and equipment of the Soviet Red Army, Cossack, Chinese and assorted tribal fighting men all the way between Turkestan and India, and of the saddlery and physical qualities of the various mounts from Turkoman horses to Cossack ponies and mountain yaks, will be of intense interest to students of war, especially in the "Q" Branch. Those concerned with the commissariat department will be particularly interested in the following passage taken from the description of the return journey towards India:—

"Our cook, in his sheepskin hat and vast boots, bestrode an untamed mustang, caracoling along with a saucepan of stewed Pamir sheep under his arm. He always managed to arrive. We slept on the ground and ate off it, whilst washing was an event postponed until we arrived in a bigger village which owned a copper cauldron. We did not miss the 'Persicos apparatus,' and covered twice the ground, in comparison with the Indian pattern cortège. (*Note for Travellers*:—Your cook should always possess the thrusting cavalry spirit and a gift for trick riding)."

In the Wilds.

Describing the Chinese fortress at the point where Pamir, Chinese Turkestan, and Russian Turkestan join, Capt. Blacker says:—"Although Langgtai Post has a garrison of one decrepit Kirghiz, and would be untenable against a barrage of well-aimed brickbats, it has more than once loomed large in *Welt Politik*. The Quai d'Orsay, Downing Street and the Nevski Prospekt, used to contemplating Gibraltar, Ehrenbreitstein, or Kronstadt, could not visualize an Imperial Chinese Fortress, 'where three empires meet,' as being an edifice unsafe to lean up against."

It is precisely on such places that the course of history turns. It may well be that this particular post in High Asia will become famous in the Great War.

There follows thereafter the astonishing chase already mentioned of the Afghan Bolsheviks across the Kuen-Lun into Yarkand. The only thing to which one can compare it is some of the more moving passages written by Arctic explorers, all the way from Sir Benjamin Franklin to Captain Peary, and mingled with the description of the adventure are quaint remarks on philology and ethnology which will be found most illuminating by those who are studying seriously the effect of races on war. Incidentally this section of the book is a fairly damning indictment of the existing maps of Central Asia. At the same time the best possible excuse for the map-makers is Blacker's description of his own journey.

How he arrested the Afghans and how he got back to India must be left for the book to tell. The homeward journey was but little less exciting than the outward journey.

The Persian Front.

It was about Christmas of 1918 when Major Blacker was sent off to what was vaguely known as "the Merv Front." It is here that the book really comes within the province of the forthcoming Great War. As already mentioned the general idea of this war in 1918-19 was to prevent the Soviet armies from breaking through into Persia, causing a revolution there, and wrecking the Anglo-Persian oil wells. It has been pointed out in THE AEROPLANE on various occasions that in the Great War we shall have to depend largely on Anglo-Persian oil for the fuel of our Air Force and our Navy. And anyhow there is a mass of Admiralty money in the Anglo-Persian wells.

Merely as a reminder one may mention that when the Russian armies begin to move they will immediately capture all the European oilfields in Galicia and Roumania. Simultaneous trouble in the Pacific will mean that the Japanese will have the East Indian oil, and probably trouble between the United States and Japan will mean that America will want all her own oil. Consequently there will be nothing left for us except Anglo-Persian oil and such oddments as we can get from Trinidad and Egypt. It is obvious therefore that when the War begins one of the most important operations will be the holding of the Northern and Western Persian frontiers against invasion from Turkestan and the Caucasus.

One may assume that Baghdad will be the centre of operations for the Caucasian front and if we play our cards properly we shall have the assistance there of our old friends the Turks. But the long Persian front from the Caspian to Afghanistan will probably be the centre of much bigger fighting owing to the fact that the plains of Turkestan make it possible to mass enormous forces for operations against Persia.

The Great Rock Barrier.

It is with this particular area that Major Blacker deals in the latter and major portion of his book and it is well worth the while of every Air Force officer to study the geography of this country with the greatest diligence. It is improbable that so much general and detailed information of the geography and topography of the country can be found outside of this book. The frontier seems to have been specially designed for our special benefit.

Describing it Blacker says—"This is the rock wall formed by the inner scarp of the range that, running in a dead straight line, divides Persia from Turkestan. About 500 feet of sheer cliff spring up from the undulating downs of Chachha and the valleys around; the whole structure seems to have been lifted up by some cataclysm, without regard to the shape or lie of the country around. Impassable for any but trained cragsmen, with crampons and ropes, it runs for hundreds of miles from Gifan in the Kurd country to Sarakhs by the Afghan border.

"Pierced only by a few narrow gorges where streams have forced their way through, such as that of Qaratigan, it has for centuries kept warlike Mongol Turkoman and Uzbeg, not to say Russian, from getting at the convivial and engaging Persian as forcibly as they would like.

"A line of vertical cliffs of this extent is in itself remarkable, but when you have added to that the wonderful regularity with which it runs, in a straight line from point to point, and the entire lack of any break or gap, except for the few stream gorges, the whole thing becomes a wonder of Nature."

It sounds as if the defence of such a frontier should be easy but in these days of troop-carrying aircraft it might well be that an enterprising general could capture a few of the essential passes through this rock barrier and so irrupt his army into Persia. Thus it may very well be that instead of holding the passes themselves it will be better strategy to carry the war into the plains to the North where the open country will make matters so much easier for aircraft. Naturally the aircraft bases will be well to the South of the rock wall and the forces against which they have to operate should be an easy mark on the vast plains of Turkestan which are so well described and illustrated in the book.

The Railway War.

Descending from the rock frontier Major Blacker and his detachment went to Merv in Russian Turkestan, just to the North-West of Afghanistan. The actual war at that period was being fought along the railway which runs from Krasnovodsk on the Caspian roughly parallel to the Persian frontier through Merv up to Bokhara and then down to the Afghan frontier. It is in fact the old Russian strategic railway which was part of the great scheme for the conquest of the Middle East and India by the Muscovite. Part of this railway was held by the Bolsheviks and part by the minute Army to which Blacker had been sent and the war consisted very largely of actions between armoured trains.

Some idea of it may be gained from the following passage:—"It soon became clear that, since the single line ran for hundreds of miles amongst the sand-dunes, some 20 to 40 feet high, of the Kara Kum Desert, it was necessary to have a bend in the line in order to fight a battle or to make a stand. For when one side attacked, it was usual for their armoured train to open the artillery action by steaming round the bend out from the cover of the sandhills, with its guns in action, in support of the infantry attack over the desert, whilst the cavalry operated thirstily on the flanks.

"When the Bolsheviks were defeated and got on the run down a straight stretch of railway, they could not make a stand until the line formed a bend again, and so gave cover for their armoured train. During the whole of the 1918 fighting, and in January and February, 1919, the Reds were much superior in artillery, whilst their very numerous machine-guns were well kept and handled by carefully-selected teams of trained soldiers.

"A favourite gambit in these operations was the time-honoured jest of blowing up the line in rear of the enemy's trains. To do this, a formation colloquially known as a "Polsot" (i.e., Polu-sotnia—half-squadron of non-regulars) would provide itself with some gun-cotton, and proceed on a long, weary, and very thirsty detour across the dunes of the desert for many miles until they reached the line behind the enemy. The rest was easy, except that the return journey was usually even more drouthy than the outward.

"Before very long a bright brain realised that a contact mine left under a rail offered a far better result for the

(*Continued on page* 466.)

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY, JUNE 30.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

The wide-spread interest which is taken in the low-powered aeroplane is evidenced by the fact that Prof. Leonard Bairstow, F.R.S., has been moved to commit himself to print on the subject of their possibilities.

Some of his pronouncements on this subject are considered below. It is difficult to know whether to congratulate Prof. Bairstow on his prompt recognition of a new departure, or to commiserate with the light aeroplane in having attracted the attention of the "unco' learned."

Photographs which are reproduced in this issue showing a Dornier seaplane with an engine of only 80 h.p. taking off and flying with six people on board, may be regarded as pointing to the ultimate possibility of developing low-powered commercial aircraft.

A note describes the ingenious tool devised at the Junkers Werke for closing rivets in the interior of a small diameter tube.

THE LOW-POWERED AEROPLANE AND THE PROFESSORIAL MIND.

That the low-powered aeroplane of the type which is now the subject of so much interest affords both a valuable and an amusing field for experiment seems to be fairly universally admitted. People of so widely different an outlook on affairs in general as the Editor of THE AEROPLANE and Professor Bairstow have both regarded the type as worthy of discussion, but there seems to be only the vaguest recognition of the real importance of the development of this type.

Professor Bairstow, in an article on the subject in "Nature" of May 19 discusses "The Low-Powered Aeroplane or Avivette" in an eminently serious manner and generally applauds this latest phase of aviation. He says: "The low-powered aeroplane can scarcely fail to react beneficially on scientific knowledge and its application." One could thank him more heartily for these few kind words were it not for the reservations with which he hedges around his benediction.

Prof. Bairstow as is well known lives in a world curiously isolated from that of practical aeronautical development, and perhaps cannot be expected to be properly informed as to what is actually occurring in that world. This detachment is doubtless a useful enough quality in its way, but it scarcely justifies him in undertaking to "analyse the projects and achievements (of the low-powered aeroplane) in relation to the scientific knowledge involved" without taking the trouble to verify the facts of the case.

In the course of this analysis he delivers himself of the following interesting dicta:—

"Risk (in the low-powered aeroplane) is only incidentally reduced, and neither the extracts (quoted from the Daily Press anent flights by M. Barbot and Major Wright) nor current technical literature show any attempt on the part of designers of light aeroplanes to pay special attention to the fundamental problems of stability and control.

"Since a claim for the reduction of risk has been made it may be as well to state the view that the only contribution made to safety is in the sense that it is less dangerous to strike the ground at 30 m.p.h. than at 60 m.p.h."

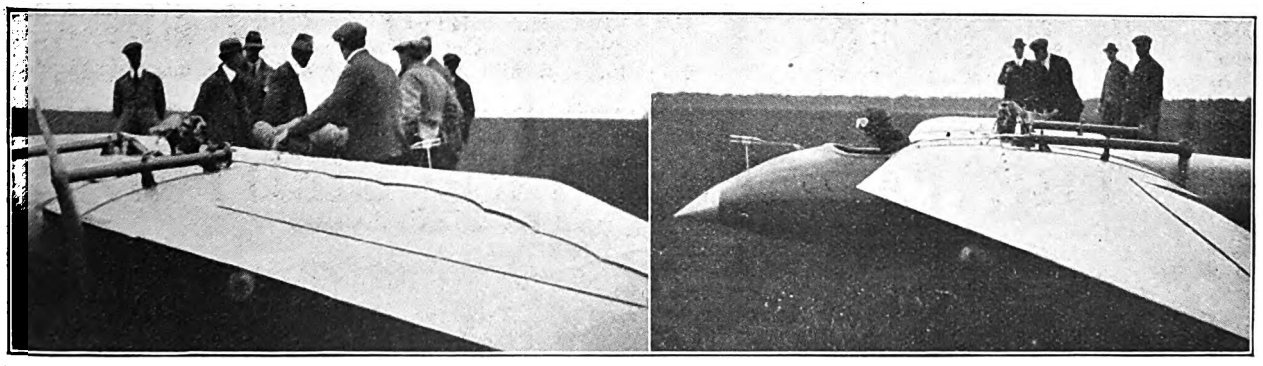
"For the past eight or ten years it has been realised that all good aeroplane design tends to produce a result in which for the most economical speed of flight the weight carried is about nine times the resistance experienced."

Readers of this paper scarcely need to be reminded of the gross inaccuracy of the first of these statements. If one point in connection with the glider and the low-powered aeroplane has been stressed in these pages it has been the very grave defects of the normal types of aeroplane control which were revealed by last year's Gliding Competition, and the very great value of gliders and similar machines as a method of practical experiment on the problems of control.

If one recollects aright a special panel of the Aeronautical Research Committee whereof Prof. Bairstow is so striking an ornament have been labouring for some years on these problems of control and stability. No very great progress in the design of aeroplanes has yet been noticed as a result, and it seems a little indiscreet to upbraid the light aeroplane during its first month of life because it has not accomplished what this learned Committee has failed to do.

There is not the least doubt that both the glider and the low-powered aeroplane present to all and sundry who are interested in these matters opportunities for experiment of the most conclusive type on the subject of control and stability which are capable of leading to practically useful results in a tithe of the time and at a fraction of the cost of submitting the simplest problem in applied aerodynamics to the Research Committee.

As to the question of risk Professor Bairstow correctly ascribes the main element of improved safety in the low-



The Gnosspelius "Gull" (Blackburne 698 c.c. engine). On the left a view showing the curious "step" in the upper wing surface. Right, the pilot ensconced in his "habitacle."

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powered aeroplane to the reduction of landing-speed. The reduction—in the circumstances assumed by him—is to about one-quarter of the risk involved in the heavy normal type—a reduction which may appear negligible to him but which is none the less material.

From the argument that in average standard aeroplanes the best ratio of weight to resistance is about 9 to 1 it is deduced that the expectation of flying 100 miles per gallon is "too optimistic" and that a considerable improvement in performance will be necessary before it can be reached. It is quite true that it is assumed that the machines expected to put up such a performance are to be two-seaters—but except on a very strained rendering of a paragraph taken from a lay journal there seems to be no ground for assuming that anyone expects 100 m.p.g. from anything more than a single-seater.

The curious point about this particular line of thought is that the whole motive behind the movement for the development of the low-powered aeroplane is the belief among certain of those unregenerate spirits who refuse to be quelled by the pronouncements of the N.P.L. and the Aeronautical Research Committee that a ratio of lift to resistance of 9 to 1 is not the result of good aeroplane design, but of the lack of imagination and initiative displayed by those who are supposed to be the fountains of aeronautical knowledge in this country.

Major Gnosspelius' small aeroplane with the Blackburne engine is one believes the first of the type to have been projected in this country, although it was not the first to be completed. The reason for its existence was the fact that certain experiments made by the designer by methods which must have deeply pained our more orthodox aerodynamicists led him to believe that the accepted 9 to 1 L/D ratio could in fact be approximately doubled.

The "Gull" as the machine is now to be called was a large scale test to check the original model tests. The model tests indicated an L/D of the order of 16 or 17/1. The performance of the "Gull" so far as it has been ascertained tends to confirm the truth of the original estimate, and if the "Gull" has an L/D ratio of even 12/1 "good aeroplane design" to the standard set by Prof. Bairstow producing a ratio of only 9/1 would seem to be a somewhat expensive type of amusement.

Prof. Bairstow however is far from being the only person who takes too limited a view of the developments which may arise as a result of the experimental work which is now being undertaken in various quarters.

In the first place the mental and moral effect on a large number of aeroplane designers and drawing office staffs of considering the entirely new problems which the light aeroplane presents cannot fail to be beneficial. There was a time when those who designed and built aircraft were bold experimentalists. After 10 years of Government supervision under Advisory Committee advice these same bold experimentalists are now either out of the aircraft world or have had their experimental faculties very severely repressed. The Itford meeting of last year showed that in many cases the old spirit was only suppressed and not dead, and the low-powered aeroplane may lead to its permanent revival.

If so the Royal Aeronautical Society will gain. The possibility that an aircraft constructor might at any of their meetings follow the example set long ago by Mr. Howard Flanders and explain quite clearly what he thought of the N.P.L., the R.A.E., or the Advisory Committee would certainly increase the attendance.

But quite apart from the possible indirect effects of starting a new line of thought in spheres where a tendency to mental stagnation is strongly encouraged, the light aeroplane is after all just an aeroplane. If a motor-cycle engined single-seater can be built with an L/D ratio of 15/1—and it certainly can—so equally can a one, two, three or six-seater.

And the effect on the commercial possibilities of aviation of such a change in the characteristics of the aeroplane would be very much of the same nature as the effect on the bicycle of the substitution of ball-bearings and pneumatic tyres for plain bearings and solid tyres.

In fact it may be much greater. The effect of such an improvement is to reduce the h.p. necessary to carry a given total weight of aeroplane at a given speed in the inverse ratio of the L/D value. For the same total weight therefore one needs a smaller and a lighter engine, and a smaller fuel supply, and the weight so saved can be used to increase the paying load. That is to say that if a six-seater with an L/D of 9 requires 360 h.p. to fly at 110 m.p.h. then a machine of the same total weight but with an L/D of 16 will need only $9/16 \times 360 = 203$ h.p. This means a saving on engine weight alone of 300 lbs. or so, so that the six-seater becomes a 7½-seater so far as load capacity is concerned. For a 3½ hours' flight the saving in weight of fuel would be another 240 lbs., or the equivalent of another passenger plus a fair amount of extras—which is roughly 1½ times the useful load for 9/16 the h.p.—or in other words the ton-miles per gallon can be nearly trebled.

Put in another way, one should be able to produce a new six-seater about 2/3 of the total weight of the original, giving the same speed for $2/3 \times 9/16 = 9/24$ of the original h.p. or about 135 h.p.

This is no exaggeration of the possible result of development along the lines indicated by the results already achieved with low-powered aeroplanes. There will be found in this issue certain photographs of a Dornier "Libelle" flying-boat in the air carrying a total complement of six persons with an 80 h.p. engine. The six persons are pretty certainly not up to standard passenger weights, and the accommodation for this number can scarcely be regarded as adequate.

Yet the fact that the machine gets off the water and flies with this load is fairly good evidence that the six-passenger machine of 150 h.p. or so is not merely the creation of an over-active imagination.

ENGINES FOR LOW-POWERED AEROPLANES.

The "Coventry Victor" Flat Twin.

The "Coventry Victor" Flat twin engine of 688 c.c. cylinder capacity would appear to be amongst the most suitable of British motor-cycle engines for adaptation to light aeroplane purposes. The first "Coventry Victor" engine was built in 1911. The type took part with marked success in many hill climbs and reliability trials in 1913-14 and would undoubtedly have been built in large numbers thereafter had the war not intervened.

The designers and manufacturers were engaged during the war on the production of aero-engines and parts and since the war they have applied their experience, and the results of research work to the production of their present type of engine.

Although one cannot remember to have seen many "Coventry Victor" engines on the road in the South of England, it is believed that they are extremely popular in the more northern parts of this island, where their qualities are shown up to a relatively greater degree owing to the mountainous nature of the country.

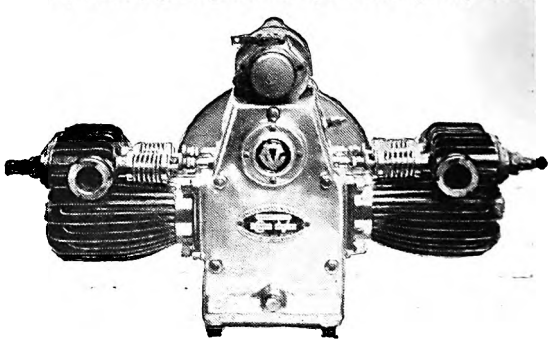
In any case they have certainly made an extremely good show in competitions of a very arduous nature, and have acquired a very high reputation for smooth and vibrationless running and for extreme reliability.

The "Coventry Victor" Motor Co., Ltd., are at present developing a special engine for low-powered aeroplanes which is based on their racing "Super-Six" motor-cycle type. They have been able to reduce the weight of this model to approximately 60 lbs., and they have taken steps to develop the maximum possible power at revolutions sufficiently low to permit of a high airscrew efficiency. They are also preparing a model in which the half-time shaft carries the airscrew hub, and it will thus be possible to run the engine up to its speed of maximum power, without too high an airscrew speed.

These engines will be equipped with a mechanical oil-pump, and with an adequate thrust-race for the airscrew shaft which is independent of the main crankshaft-bearing. All bearings on the crankshaft are of the Skefco self-aligning type.

The racing type engine from which these special models are being developed, differs from the Standard motor-cycle engine in the possession of larger valves of alloy steel, compound valve springs, high-lift cams, and extremely light pistons. Experiments are being made with pistons of a specially light alloy but at the moment the firm are not sufficiently assured of the reliability of these pistons to recommend them for use on aircraft.

The "Coventry Victor" engine has a bore and stroke of 75 mm. by 78 mm., giving a total cylinder capacity of 688 c.c.



The "Coventry Victor" Engine.

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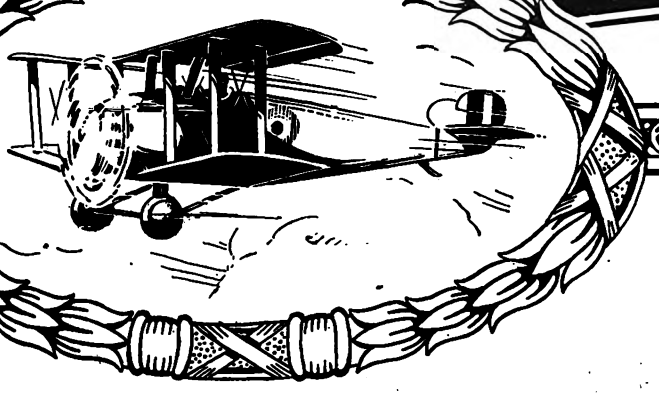

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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

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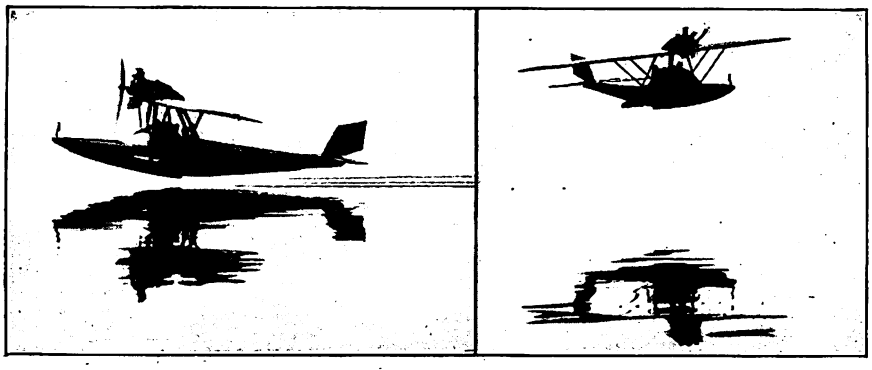


PASSENGER-CARRYING WITH LOW POWER.—The Dornier "Libelle" flying-boat, fitted with a 7-cylinder 80 h.p. Siemens-Halske engine, taking off and flying with six people on board.

The weight of load carried was 340 kg. (750 lbs.) and the speed attained 138 km.h. (85 m.p.h.)

The cylinders are of cast-iron with side by side valves and are ribbed parallel to the stroke instead of the usual circumferential fins.

The valves are driven by tappet rods from a substantial camshaft which is carried right across the crankcase above the crankcraft centre line. The magneto is carried on top of the crankcase and is chain-driven from the camshaft. The base of the crankcase forms an adequate oil-sump, and as is noted above a mechanical oiling system is fitted.

The crankshaft is a single forging with integral balance weights, carried on one ample ball-race at the after-end and on two races at the drive-end. For aeroplane work one of these is arranged to take the airscrew-thrust.

Altogether the "Coventry Victor" would appear to be a singularly well-designed, simple and sturdy power-unit which should be extremely reliable in service.

There is a general impression that a side valve engine such as this cannot be expected to develop outputs and mean effective pressures comparable to those attained with overhead valves. This view is not altogether justified by results except in cases where very high piston-speeds are employed. In the case of the motor-cycle engine applied to aircraft there is good reason to seek for an engine which develops maximum M.E.P. and maximum fuel economy at relatively low r.p.m. and in this respect the performance of the "Coventry Victor" shows that the side valve engine is by no means to be despised.

Tests made on a specimen engine to discover what can be done in the way of attaining maximum output at moderate r.p.m. show that the "Coventry Victor" can develop a M.E.P. of over 90 lbs. per sq. in. at from 1,400 to 2,400 r.p.m. At 2,400 r.p.m. the B.H.P. is 12.3, and the fuel consumption only .6 pint per B.H.P. hour.

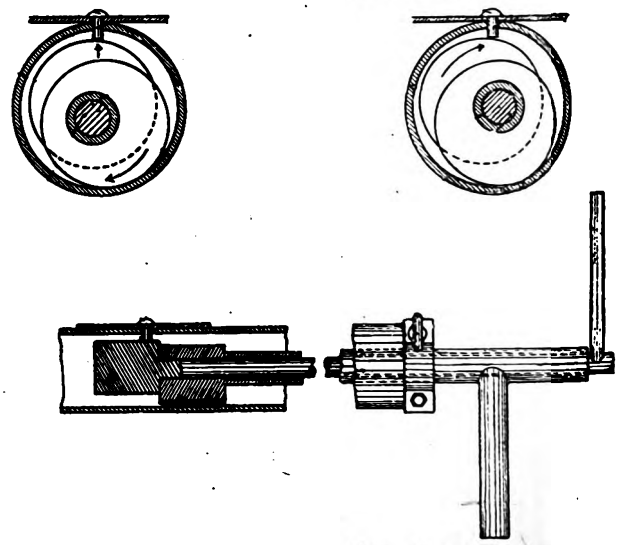
These characteristics render the "Coventry Victor" eminently suitable for use with a direct drive airscrew—a fact which will give it a marked advantage over other engines which although they apparently develop considerably greater outputs, cannot be used at full power without the addition of a gear-drive.

AN INGENIOUS TOOL.

A good many people in this country are undoubtedly puzzled as to the method used in the Junkers Werke at Dessau for riveting the duralumin coverings of Junkers wings to the tubular spars which form the frame-work. These tubular spars are of quite small diameter, and rivet-heads are formed on the inside of the tube.

The tool used for this purpose is shown in the attached diagram. It consists of a long tubular shaft carrying at one end an eccentric steel block of somewhat smaller diameter than the tube inside which the riveting is to be performed. Inside the tubular shaft is a second solid shaft, carrying at its end a second eccentric block similar to that on the first shaft. The inner shaft can be rotated relatively to the outer one by appropriate handles at the end opposite to that carrying the two eccentrics.

When the two eccentrics are aligned one with the other they may be inserted into the tube as far as necessary.

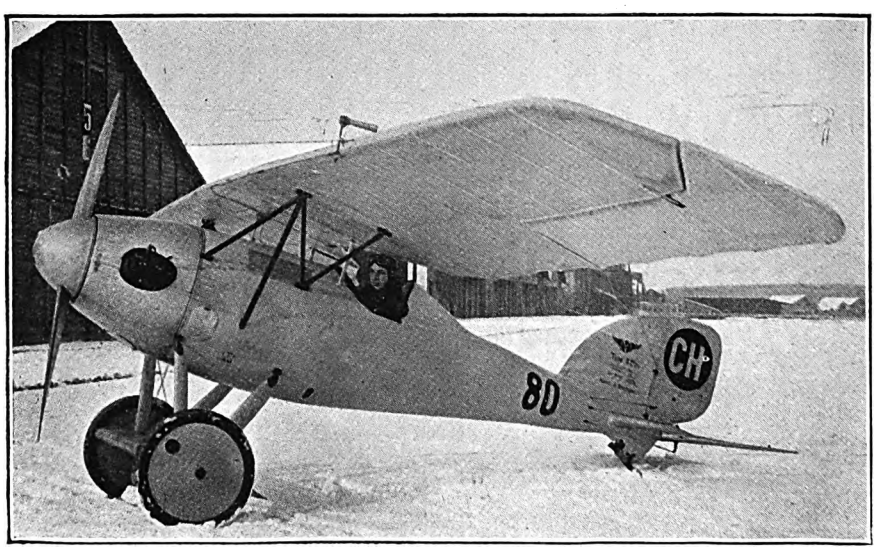


Then by rotating the two handles, the eccentrics may be caused to provide inside the tube an anvil-block, bottoming on the face of the tube opposite the rivet-hole and leaving a variable space below the rivet-hole.

If a rivet be inserted through the hole, the handles rotated until the rivet just lifts on the block, a process of combined hammering on the outer rivet-head and of rotation of the handle speedily forms the desired interior head.

The tool is provided with an adjustable stop-block, which centres the tool in the open tube end, and which can be set to the correct length to bring the anvil-blocks under each successive rivet-hole.

It is perhaps unnecessary to observe that this ingenious device is protected by patents.



A SWISS SPORTING MONOPLANE.—This extremely neat little machine was built by the "Agis," the Aeronautical Society of Zürich University to the designs of Herr Spalinger. The machine is fitted with a 30 h.p. Haacke two-cylinder engine, weighs 190 kg. (420 lbs.) empty and 300 kg. (660 lbs.) loaded.

The maximum speed is 120 km.h. (75 m.p.h.)—which is rather lower than one might have expected.

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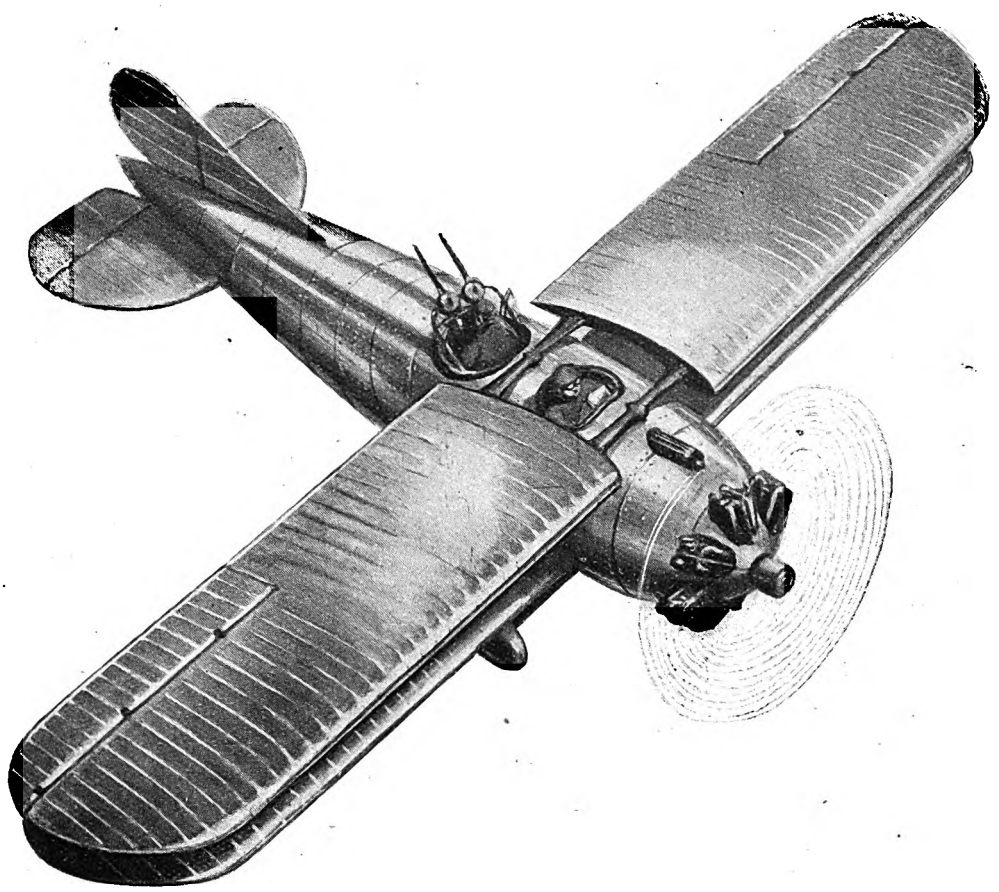
ALL-METAL

AEROPLANES AND SEAPLANES.

Designers and Constructors of All-Metal Aircraft for the British Government.



As a result of the most exhaustive tests carried out by the R.A.F. Factory on the "Short" All-Metal Aeroplane, Messrs. Short Bros. have now received an order for further machines of this type. When completed these machines will be the only All-Metal machines, that is to say, machines complete with metallic surfaces, to be made in Great Britain.

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THE PRICE OF LIGHT AEROPLANES.

The following communication has been received from a well-known firm of aircraft constructors :—

There has been a great deal of discussion lately amongst gliding enthusiasts regarding the cost of the construction of light aeroplanes and the general impression has been, that they should be turned out at a selling price equivalent to that of a motor-cycle and side-car combination. This is probably due to the Press having referred to the light aeroplane as the motor-cycle of the air.

Although it is unnecessary to point out the fallacy of this to the Aircraft Trade, it has unquestionably given an entirely false impression to the gliding enthusiasts among whom the manufacturers of light aeroplanes must find their customers.

This conception of the price is based on a complete lack of knowledge as to what a light aeroplane is. At present the layman thinks that the light aeroplane is a flimsy affair of sticks and fabric, whereas in reality it is, and must be, a sound and well-built aeroplane in miniature.

In its manufacture it is necessary to use the finest workmanship and materials, and to employ the most up-to-date methods of Aircraft construction in order that one may obtain the last ounce of efficiency combined with the greatest strength and minimum weight.

Again, it must be borne in mind that the demand for these machines is not sufficient at the present time to manufacture them on a production basis, and it is common knowledge that the cost of producing one machine at a time is greatly in excess of that of each of a series of say ten or more.

It is a curious fact that the cost of a full-sized aeroplane bears a close resemblance to its weight fully loaded in the ratio of one pound sterling to each pound avoirdupois and this ratio may be taken by would-be purchasers as giving an approximation of the present-day price of light aeroplanes.

It is obvious that no commercial firm will market a product at a price which shows a loss on cost of production, so until the demand for the light aeroplanes increases, one must not expect them to be produced on a commercial basis at anywhere near the motor-bicycle figure.

It is perhaps dangerous at the present time to hazard a guess as to the price during this year, but one feels fairly confident that £500 would be considerably nearer the mark than £150, which would probably only cover the cost of the actual materials used, including such expensive items as engine and fittings, propellers, instruments, fabric and dope.

The need for strength and good construction in the light aeroplane is just as great as in its full-sized prototype, and one's advice to the intending purchaser is to pay a good price to a reliable firm for a machine which is guaranteed up to an adequate factor of safety backed up with the finest materials and workmanship.

A TECHNICAL COMMENT.

[In some very important points one is disposed to agree with the above statements. The expectation that any aircraft manufacturer will be able to supply isolated examples of a satisfactory low-powered aeroplane at a price in the neighbourhood of £150 is not in the least likely to be realised.

[On the other hand the assumption that the cost per lb. of loaded weight need be of the same magnitude as that of the hitherto standard type of heavy aeroplane is entirely fallacious. Any manufacturer who attempts to produce a light aeroplane for sale in which methods of construction as complex and therefore as costly as those usual in aircraft construction will undoubtedly find that the light aeroplane is relatively a much more expensive affair. The deduction from this is not that light aeroplanes must be expensive, but that simple and cheap methods of constructing them must be devised.

[In this direction quite a good deal can certainly be accomplished.

[Two entirely independent estimates for the cost of construction of the first example of one particular type of light aeroplane—both made by competent constructional firms—agree on the figure of £250, including all works and overhead costs but not including profits. The cost of subsequent machines to the same design would obviously be reduced appreciably, and if a batch of machines could be put in hand at one time the cost would be still further reduced.

[The profitable selling price of such a machine would, of course, depend on the demand. If one machine alone were to be sold £500 would not be an unreasonable price. If a certain market, justifying the production of batches of, say, six at a time, were to be available, the correct figure would not be more than £250-£300.

[The problem of getting the selling price down to £150 is entirely one of demand—and it certainly would not need a market such as that available to the American motor-car industry to bring it down to a still lower price.

[But it is as futile to expect to sell light aeroplanes which in their detail design and construction follow standard aircraft constructional methods as it would be to expect to sell a small model of a Rolls-Royce as a cheap light car.—W. H. S.]

FURTHER TESTS WITH THE "WREN."

The "Wren," the little A.B.C.-engined monoplane built by the English Electric Co. at Preston to the designs of Mr. W. O. Manning after having been very thoroughly examined following her first flights, and having endured certain minor modifications, of a cleaning-up nature, made a very successful flight of some 68 mins. duration at Lytham on the morning of June 15. In the course of this flight a height of 2,200 ft. was attained.

A BIG AMERICAN ENGINE FUSION.

The Wright Aeronautical Corporation, of Paterson, N.J., have acquired the assets and business of the Lawrance Aero Engine Corporation, and Mr. Charles L. Lawrance becomes Vice-President of the Wright Corporation, where he will continue the development of the now well-known air-cooled radial engines that have hitherto carried his name.

By this acquisition the Wright Aeronautical Corporation will greatly strengthen their position as one of the biggest aeroplane engine firms in the United States.

To their present engines : the 200 h.p. Wright E.4, the 400 h.p. Wright type 4, the 600 h.p. Wright T.2, and the 300-400 h.p. Wright D.1 (airship), all of which are water-cooled, they will now add the 60 h.p. Lawrance type "L" 3-cyl. radial, the 200 h.p. Lawrance type "J" 9-cyl. radial, and the 150 h.p. Lawrance type "R" 9-cyl. radial air-cooled engines.

TO BE NOTED.

The Midland Motor Cylinder Co. Ltd., Dartmouth Road Foundries, Smethwick, announce that in consequence of greatly increased business, a complete reorganisation of their commercial departments has now been carried out, including the installation of three telephone numbers and private branch exchange. Telephone numbers now are Smethwick 451-2-3.

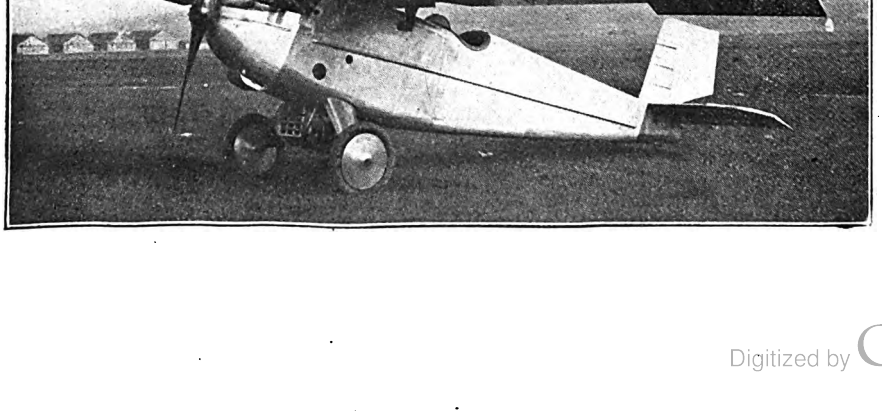
The Sales Management are keen at all times to improve the service of the firm's customers.

MORTGAGES AND CHARGES.

VARIOPLANE CO., LTD.—Particulars filed of £10,000 debentures authorised April 6, 1923, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £3,500.

NEW COMPANY.

F. M. SUMMERFIELD, LTD.—Private company. Registered in Dublin, June 8. Capital £3,500 in £1 shares. To carry on the business of dealers in motor-vehicles, aeroplanes, gliders, cycles and their parts and accessories, and wireless equipment of every kind. The first directors are :—F. M. Summerfield, 5, Rutland Terrace, Clontarf, Dublin, motor engineer; R. J. Duggan, Wilton, Merrion Road, Merrion, Dublin, turf accountant. Registered office : 138, Lower Baggot Street, Dublin.



THE DORNIER "FALKE."—This photograph shows the Dornier single-seat fighter—described in this paper of Dec. 13, 1922—in a slightly modified form. The span has been made smaller, reducing the surface by about 1.5 sq. m. (16 sq. ft.), and an increase in speed and manœuvrability has thus been secured.

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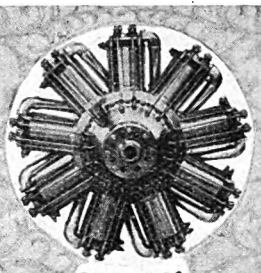
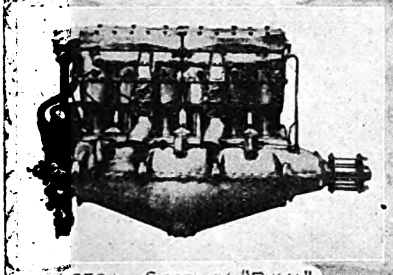
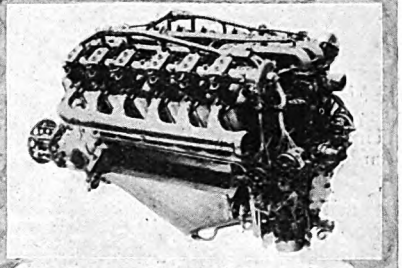
AVRO TYPE 504 K.


200 h.p. B.R.2

BRISTOL FIGHTER. F.2B.


230 h.p. SIDDELEY "PUMA".

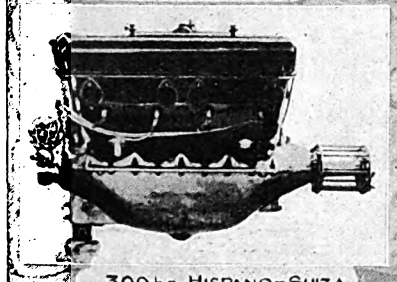
D. H. 9.


360 h.p. ROLLS-ROYCE "EAGLE" VIII

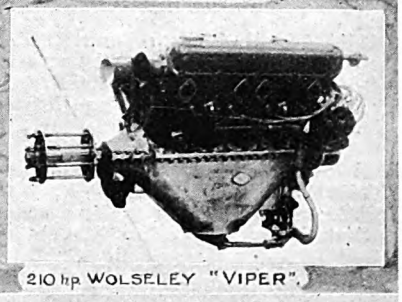
D.H.9.A.

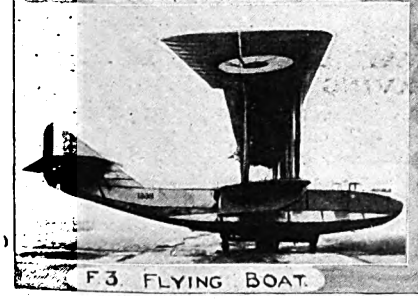
100 h.p. MONOSOUPAPE

MARTINSYDE. F.4.

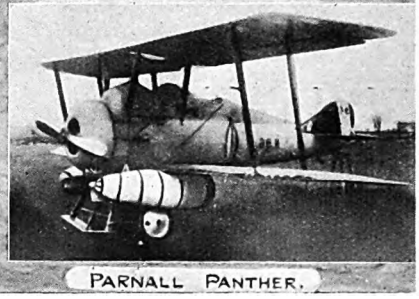

300 h.p. HISPANO-SUIZA.

S.E.5.A.


210 h.p. WOLSELEY "VIPER".


F.3. FLYING BOAT.

110 h.p. LE RHONE.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KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

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(Continued from page 456.)

trouble expended, in that one could hope thus to bag a gun truck. The counter to this was the placing of an empty truck or two in front of the leading gun-truck to take the force of the explosion. The attack was again driven to put on their thinking caps, and devised a mine that only responded to the tender caress of something weighing several tons, such as a gun or a locomotive.

"This was a trump card that took several tricks, until another expert used a truck loaded with old rails to make the bump. Now, not only did the subtle ones realise that the blowing up of five tons of old iron was a poor result for a half-squadron with their tongues hanging out permanently, but that the engine-drivers' eyes stuck out as on stalks and became so marvellously penetrating that they could spot a mine, however well hidden, in time to stop the train. So the final act was neat and effective.

"No explosive was used, but one bright morning the Bolshevik engine-driver found himself bumping along the sleepers whilst his wheels were still between the rails. The "Pol-sot" had opened out the gauge for an inch or so over a length of several hundred yards, spiking the rails neatly down again and covering up their traces.

"These experiments in practical railway engineering had cost a certain amount, and all along the line from 'Ashqhabad to Merv and beyond, the casual traveller saw battered, blackened trucks and coaches lying on their backs by the side of the line, with their wheels in the air. The Russian railway engineers certainly showed wonderful skill and speed in getting things going again after the various crashes and explosions.

"To the civilised Western accustomed to regard a railway as a sort of unerring mechanical brand of Providence, and as something to set one's watch by, it was a strange sensation to have a complete broad-gauge modern railway at one's beck and call, with whole trains and locomotives to play about with and to blow up. Railway warfare in Russia was something *sui generis*, and a novel experience for any soldier."

It is probable that something of this nature may take place in the early days of the Great War merely because although as Maurice Baring has remarked, "One comes to every war as a novice" every war is carried on along the lines of the last war till it develops its own special features.

(*To be continued.*)

THE GROSVENOR CUP RACE.

The race for the Challenge Cup presented by the Lord Edward Grosvenor will start from Lympne Aerodrome at about 10.30 hrs. on Saturday next. The limit man, Mr. Bert Hinkler on the "Baby" Avro should reach Croydon about 11.15 and Birmingham about 13.00 hrs.

The general scheme is that the competitors shall be at Birmingham during the lunch hour and get away again soon enough to avoid interfering with local sports on the Castle Bromwich Aerodrome. They should arrive at the Filton Aerodrome, Bristol, during the afternoon in good time to provide interest and they should be at Croydon on the return journey at or about tea-time. The winner ought to reach Lympne about 18.00 hours.

The following list of competitors gives the identification mark of each machine, the name of the entrant, the name of the pilot, the title of the machine and engine, and the handicap in that order:—

G-EAUM.—A. V. Roe: B. Hinkler: Avro "Baby," 35 h.p. Green.—1 hr. 34 min. 20 sec.

G-EAGP.—Lieut.-Col. F. K. McClean, A.F.C.: F/Lt. W. H. Longton, D.F.C., A.F.C.: Sopwith "Gnu," 110 h.p. Le Rhône.—1 hr. 31 min. 39 sec.

G-EBFB.—Lieut.-Col. M. O. Darby: H. H. Perry: Avro 504K, 100 h.p. Bristol "Lucifer."—1 hr. 30 min. 24 sec.

G-EBGV.—Lieut.-Col. John Barrett Lennard: Capt. R. H. Stocken: Avro 504K, 110 h.p. Le Rhône.—1 hr. 26 min. 34 sec.

G-EAMZ.—F. P. Raynham: F. P. Raynham: Avro 504K, 130 h.p. Clerget.—1 hr. 19 min. 11 sec.

G-EADA.—Sir William Letts, K.B.E.: F/O. H. A. Hamersley, M.C.: Avro 504K, 100 h.p. Bristol "Lucifer."—1 hr. 17 min. 23 sec.

G-EBCA.—Dr. E. D. Whitehead Reid: Dr. E. D. Whitehead Reid: S.E.5A, 80 h.p. Renault.—1 hr. 15 min. 37 sec.

G-EAWS.—S/Ldr. Franks L. Robinson, D.S.O., M.C., D.F.C.: S/Ldr. Franks L. Robinson, D.S.O., M.C., D.F.C.: Boulton & Paul P.9, 90 h.p. R.A.F.1A.—1 hr. 5 min. 26 sec.

G-EBGC.—Sir Henry White-Smith, K.B.E.: C. F. Uwins: Bristol "Lucifer," 100 h.p. Bristol "Lucifer."—45 min. 37 sec.

G-EAVP.—Sir G. Stanley White, Bart.: Major E. L. Foot, M.C.: Bristol Monoplane, 100 h.p. Bristol "Lucifer."—Scratch.

THE INTERNATIONAL AIR CONGRESS.

Those concerned with aviation who have not yet become subscribers to the Air Congress are reminded that they should send their subscriptions of £1 to the General Secretary, the International Air Congress, 7, Albemarle Street, W.1, this week whether they desire to take part in the proceedings or not. As space is so limited and as the non-technical press will be so full of the doings of the Congress it is not proposed to devote to it in THE AEROPLANE more than enough space to make an historical record of what is done, for one is merely preaching to those already converted.

As the result of the Congress next week will be pretty busy. The proceedings will be opened on Monday at the Institution of Civil Engineers by His Royal Highness the Prince of Wales at 10.45 hrs. and at 11.15 hrs. His Grace the Duke of Sutherland (Chairman of the Congress Main Committee) will deliver the inaugural address.

Papers, to be followed by discussions, will be read on Monday, Wednesday and Friday mornings and afternoons.

On Monday evening at 21.00 hrs. His Royal Highness the Duke of York, President of the Congress, will receive the members of the Congress at the Hotel Victoria. On Tuesday the First Commissioner of Works will give a Banquet at the London Museum, St. James's, at 20.00 hrs. On Wednesday at 21.00 hrs. the Lord Mayor of London will hold a reception at the Mansion House. On Thursday at 22.00 hrs. the Duke and Duchess of Sutherland will hold a reception at Hampden House. On Friday the Secretary of State for Air and Lady Maud Hoare are giving a garden party and at 21.00 hrs. there will be a reception at the Science Museum, South Kensington.

On Tuesday and Thursday, when there are no papers or discussions, members of the Congress are invited to visit about twenty various air stations, the Royal Aircraft, Establishment and aircraft factories. Some members of the Congress will attend the R.A.F. Independent Force Dinner on Tuesday and some will attend the R.A.F. Gathering on Friday.

On Saturday Sir Samuel Hoare will deliver the valedictory address to the Congress in the morning. Everybody will go to the R.A.F. Pageant at Hendon in the afternoon And the survivors will, with luck, reach the Official Banquet at the Hotel Victoria some time on Saturday night. Altogether it looks like a very busy week.

The first function in connection with the Congress was held on Monday of this week when the Duke of Sutherland presided at a lunch to bespeak the goodwill of the Press and to explain the why and wherefore of the Congress. His Grace explained matters lucidly and regretted that international complications prevented the presence of German representatives whose great knowledge would have been of world-wide value.

Sir Frederick Sykes announced that 450 individual members of the Congress had been enrolled, besides representatives of 17 nations. One presumes that this number includes three which were neutral during the war and the famous 22 Allied nations minus eight which could not raise the necessary subscription-money, but that being so the said eight would not be of much importance as buyers of aircraft.

Lieut.-Col. Mervyn O'Gorman in one of his usual witty and common-sensical speeches impressed on the newspaper men that we still lead in aeronautical science just as we were the first nation to produce a stable aeroplane which could be flown by a pilot who was not necessarily a tight-rope expert.

Taking it all round the Congress ought to be a success At any rate if the Executive Committee cannot command success they have deserved it by earnest work.—C. G. G.

THE ROYAL AERO CLUB AND SERVING OFFICERS.

Seeing that the Royal Aero Club is the governing body of the sport of flying, and that sporting aeroplanes have so much influence on fighting aeroplanes, and that R.A.F. officers ought to take at least as much interest in sporting flying as Army officers do in horse-racing, it is natural that the Committee of R.Ae.C. should wish to have as many serving officers of the R.A.F. as possible as members of the Club. At the same time the Committee of the R.Ae.C. recognise the fact that R.A.F. officers should be primarily members of the R.A.F. Club and cannot, with R.A.F. pay as it is, afford to pay the high subscriptions of both Clubs. Consequently it has been decided that serving officers of the R.A.F. and officials on duty at the Air Ministry can become full members of the Royal Aero Club for the nominal subscription of £2 2s. per annum so long as they remain serving officers.

The scheme is good. If the R.Ae.C. is to represent truly the sport flying then R.A.F. officers ought to support the Club. As members they will be entitled to elect the Committee which regulates the sport and so will have a considerable voice in developing what ought to be a great national asset. It is hoped therefore that many officers will avail themselves of the R.Ae.C.'s offer. Any who are interested are invited to communicate with the Secretary, Mr. Harold Perrin, at 3, Clifford Street, Bond Street, W.1.

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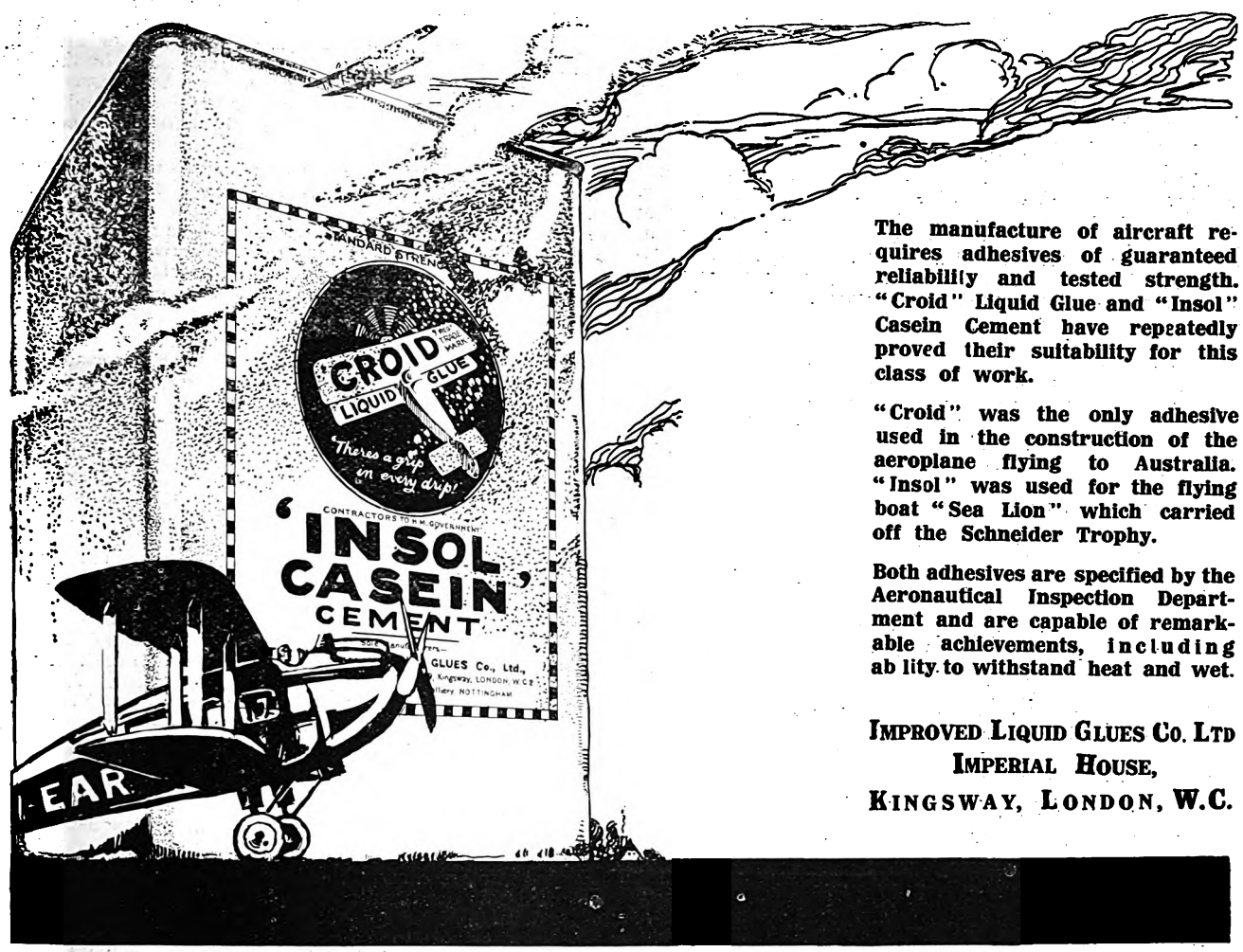

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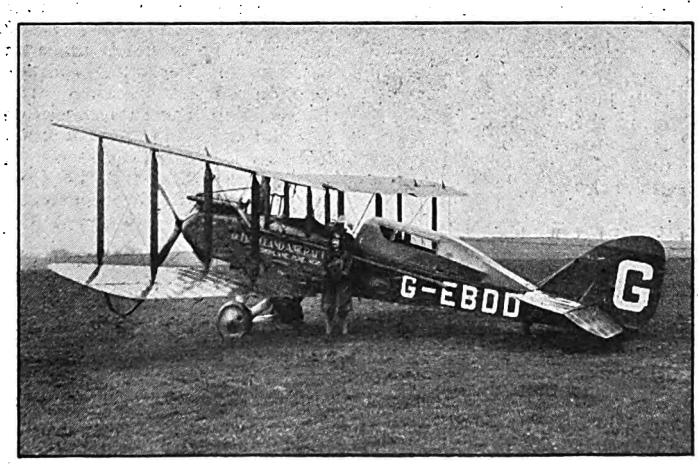

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R.A.F. INTELLIGENCE.

Appointments.

From the *London Gazette*.

Air Ministry, June 12.

R.A.F General Duties Branch.—The following resign their permanent commns.: F/Lt. G H. Hooper, M.C., D.F.C. (June 13); F/O. D. F. Cox (June 3).

Reserve of Air Force Officers.—Class A.: R. R. H. Taylor is granted a commn. as a P/O. on probation to the General Duties Branch (May 1); F/Lt. D. A. Stewart, M.C., D.F.C., A.F.C., is employed with the Regular Air Force for a period of one year (June 1). Class C.: The following are granted commns in the General Duties Branch in the ranks stated: F/Lt. G. H. Hooper, M.C., D.F.C. (June 13); F/O D. F. Cox ((June 3).

Week ending June 19.

General Duties Branch.—S/Ldr. C. G. Tucker to I.A.A.D., Henlow, 1/7; S/Ldrs. R. Leckie, D.S.O., D.S.C., D.F.C., to H.Q., C.A., 5/7; G. B. Dacre, D.S.O., to R.A.F., Base, Leuchars, 5/7, on completion of Naval Staff Course at R.N. College, Greenwich.

F/Os. C. E. Williamson-Jones, D.F.C., to Air Ministry, 18/6; C. H. Harrison, to Half-pay List, 9/6; F. H. Astle, to R.A.F. Depot (Non-effective Pool), 21/5, on transfer to Home Establishment; F. W. Foster, D.F.C., D.S.M., to R.A.F. Base, Leuchars (No. 441 Flight), 21/5; E. D. Cummings, D.F.C., to R.A.F. Base, Leuchars, 7/6, on appointment to a S.S. Commn.; H. V. David, to R.A.F. Depot, 7/6, on appointment to a S.S. Commn.; H. W. Westaway, to No. 27 Sqdn., India, 22/4; D. R. Mitchell, M.B.E., to No. 31 Sqdn., India, 22/4, L. Butler and B. G. Pool, to R.A.F Depot, 11/6, on appointment to S.S. Commns.; O. V. Lee, to R.A.F. Depot, 12/6, on appointment to a S.S. Commn.; C. E. C. Penny, to R.A.F. Depot, 6/6, on appointment to a S.S. Commn.

P/Os. E. C. Keey, to C.F.S., Upavon, 27/4, on appointment to Perm. Commn., from R.A.F. Cadet College, Cranwell; R. G. A. Vallance, to C.F.S., Upavon, 27/4, on appointment to a Perm. Commn., from R.A.F. Cadet College, Cranwell.

Stores and Accountants Branch.—F/Os. (Accountants) H. E. Cardwell, A.F.C., to School of T.T. (Men), Manston, 15/6; B. G. Drake, to Aeroplane Exper. Estab., Martlesham Heath, 15/6.

F/Os. (Stores) J. R. Gardiner, the posting of this officer from No. 2 F.T.S., Duxford, to I.A.A.D. as previously notified is hereby cancelled; F. D. D Gaussen, to I.A.A D., Henlow, 18/6.

P/Os. (Accountants) F. C. Langley, to R.A.F. Base, Gosport, 15/6; E. C. Green, to Armament and Gunnery School, Eastchurch, 15/6; F M. Hall, to R.A.F. Base, Calshot, 15/6; J. H. S. Richards, to Marine and Armament Exper. Estab., Isle of Grain, 15/6; R. W. L. Glenn, to H.Q., Constantinople Wing, 30/5.

Medical Branch.—S/Ldr. (Medical) R. H. Knowles, M.D., D.P.H., to No. 1 School of T.T. (Boys), Halton, 20/6.

F/O. (Medical) J. B. Gregor to R.A.F. Hospital, Cranwell, 29/6, to R.A.F. Depot, 23/7.

A Royal Investiture.

H.M. the King held an Investiture at Windsor Castle on June 16.

Among those in attendance upon His Majesty was Air Chief-Marshal Sir Hugh Trenchard, Bt., Principal Air Aide-de-Camp.

The following officers of the R.A.F. were introduced into the presence of the Sovereign when the King invested them with the Insignia of the respective division of the Orders into which they have been admitted :—

The Most Honourable Order of the Bath, Military Division. Received the honour of Knighthood :—Air Vice-Marshal V. Vyvyan. Companion, Military Division :—Air Commodore C. Longcroft.

The Most Excellent Order of the British Empire, Commanders, Military Division :—Air Commodore F. Halahan. Officers, Military Division :—S/Ldr. L. McKean and F/Lt. F. Linnell. Members, Military Division :—F/O. R. Divers, F/O. L. Hamilton, and O/O. L. Chandler.

The Staff College, Camberley.

It was officially announced by the War Office on June 12 that in addition to the 37 vacancies open for competition at the examination in February next year the Army Council will offer about 18 vacancies to be filled by nomination for the British Army, the Indian Army, the Royal Navy and the Royal Air Force.

The School of Military Administration.

The following officer of the R.A.F. has passed with distinction the Junior Officers' Course at the School of Military Administration, Chisledon :—S/Ldr. B. F. Moore, R.A.F.

H.M.S. "Hermes."

The *Morning Post* of June 4 states that "the aircraft carrier *Hermes* is practically complete, and her trials will take place shortly. The Director of Naval Equipment has inspected the new warship, which is the first vessel designed specially for the transport of aircraft. The *Hermes*, which has a displacement of 10,950 tons, will carry seven 6-inch guns, four 4-inch, and a number of smaller guns, besides torpedo armament. She is fitted with two hangars, enabling her to carry twenty aeroplanes, which will be raised to the flying-off decks by means of electric lifts."

The R.A.F. Pageant.

In The Aeroplane last week it was stated that S/Ldr. Roderick Hill would fly the Avro with the 1,000 h.p. Napier "Cub." One has since been told that it will be flown by F/Lt. P. W. S. Bulman, who has been doing much work with this machine at Farnborough lately. This is a change after flying the marvellous Koolhoven "Bantam."

Safety First.

According to the *Daily Telegraph* the War Office has issued the following announcement: "Amended King's regulations provide that an officer travelling on duty may at his own risk make short journeys by air, for example from London to Paris or Cologne; but any additional cost beyond that of conveyance by the ordinary means must be met by the officer. If in exceptional cases an officer is ordered by the War Office to travel by air, he will travel at public risk and cost."

The Independent Force Dinner.

The fifth Annual Reunion Dinner of the Independent Force, including all officers of Army Troops and other attached Units, will be held at the Hotel Cecil on Tuesday, June 26, at 7.45 p.m. for 8 p.m.

Air Chief-Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., A.D.C., will be in the Chair.

Evening dress with miniatures will be worn.

Tickets, price 15s. (excluding wines), may be obtained from the Hon. Sec. I.F. (R.A.F.) Dinner Club, Room 546, Adastral House, Kingsway, W.C.2, to whom any alteration in address should be sent.

The R.A.F. Gathering.

The Royal Air Force Dinner Club, which was formed at the R.A.F. Gathering on the eve of the R.A.F. Pageant last year, is holding its annual dinner on Friday of next week, June 29, the eve of this year's Pageant. The chair will be taken by Air Vice-Marshal Sir Arthur Vyvyan, A.O.C. Coastal Area.

The date is fixed for the night before the Pageant so that officers who are coming up to Town for the Pageant may be afforded this opportunity of meeting those with whom they served in the War 1914-18. The Gathering is intended to supplement not to supersede squadron and other unit dinners, and where desired it will be arranged that members of specific units shall have tables of their own at this gathering.

The price of tickets has been fixed at 10s. 6d., exclusive of wines. The place of the dinner will be notified later to applicants for tickets. Applications should be made forthwith to the Secretary, the R.A.F. Dinner Club, c/o the National Provincial and Union Bank of England, Ltd., 61, Victoria Street, S.W.1.

The Dunkerque Dinner.

The fifth Annual Dinner for officers who served in the Dunkerque Command of the R.N.A.S. and the R.A.F. from 1914 to the Armistice will be held at the R.A.F. Club on Wednesday, June 27, at 7.30 p.m. for 8 p.m.

The Chair will be taken by Air-Comdre. F. C. Halahan.

The tickets are £1 each, which sum should be fowarded with the application. Those who wish to be present should apply not later than June 24 to Treasurer, Dunkerque Dinner, R.A.F. Club, 128, Piccadilly, W.1.

THE R.A.F. SPORTS BULLETIN.

(Issued in collaboration with the R.A.F. Sports Board.)

The R.A.F. Lawn Tennis Association.

The R.A.F. played their third match of the season against the Staff College, Camberley, on the latter's ground, on June 16, the match ending in a win for the R.A.F. by 7 matches to 2.

Results.—S/Ldr. H. J. F. Hunter and F/O. C. F. Roupell beat Maj. L. C. Owen and Capt. R. G Stone, 6—2, 6—2; beat Maj. R. G. W. Firebrace and Maj. G. Leslie Smith, 5—7, 6—3, 6—3; beat Lt./Col. F. A. Pile and Maj. H. I. Allen, 6—4, 3—6, 6—3.

F/Lt J. Duminy and F/Lt. V. E. Lindop beat Maj. Owen and Capt. Stone, 6—4, 3—6, 6—4; beat Maj. Firebrace and Maj. Leslie Smith, 4—6, 6—3, 6—3; beat Col. Pile and Maj. Allen, 6—4, 6—3.

F/Lt. J. V. Hirst and F/Lt. V. Smith lost to Maj. Owen and Capt. Stone, 6—4, 1—6, 1—6; lost to Maj. Firebrace and Maj. Leslie Smith, 5—7, 6—3, 3—6; beat Col. Pile and Maj. Allen, 6—4, 6—4.

R.A.F. Cricket.

R.A.F. v. R.A.O.C.—The match between the R.A.F. and the R.A.O.C. which was played at the Oval on June 15 and 16 was left drawn. The scores were as follows :—

R.A.F., First Innings: F/O. Martin, c. Fernyhough, b. Knox, 92. F/Sjt. Charters, c. Skinner, b. Knox, 41; F/Lt. Thornton, c. Skinner b. Knox, 11; F/O. Marson, b. Love, 31; F/Lt. Livock, c. Knox, b. Love, 26; Grp/Capt. Roche, c. Sheppard, b. Knox, 0; F/Lt. Huskinson, b. Knox, 0; P/O. Pearce, b. Knox, 44; F/O. Adams, c. J. H. Sheppard, b. Knox, 17; F/Lt. Sugden, b. Symmons, 5; F/Lt. Lawson, not out, 2; Byes, 13; Total, 282.

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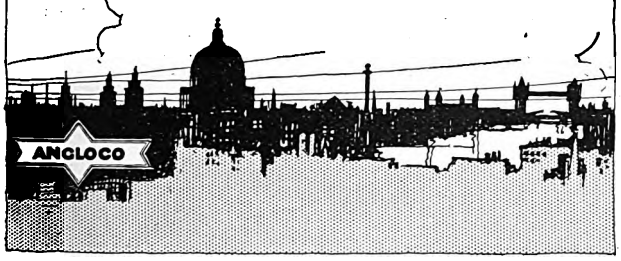
Three of Anglo's Golden Pumps (approved by the Standards Dept., Board of Trade) are installed at Waddon Aerodrome for the quick supply of Pratt's Aviation Spirit, pure, filtered and without waste.



ANGLO-AMERICAN OIL COMPANY, LTD.,
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Royal Air Force Aerial Pageant

In Aid of Service Charities.

HENDON. SATURDAY, JUNE 30th.

THE WORLD'S GREATEST FLYING SPECTACLE

A flying display of surpassing interest will be given by the Royal Air Force, demonstrating the latest and most scientific methods in aerial attack and defence.

A feature will be a parade of the latest types of war aircraft, including bombers, fighters, torpedo-carriers, naval fleet spotters and army reconnaissance machines.

Other Items include :

Rescue by air of a beleaguered party. Simultaneous manœuvres by a fighting squadron. Trick-flying by famous pilots. Demonstrations of low bombing. Air Races.

100 AIRCRAFT WILL TAKE PART.

BOXES (for six) £4, £5 and £7.

TICKETS, 2s., 5s. and 10s.

Tickets (except 2s.) may be obtained from Keith Prowse, leading agencies and libraries. **Gates Open 11 a.m.**

Special Transport Facilities have been arranged. Motor Traffic should travel via Edgware Road.

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R.A.O.C.: Col. H. S. Bush, c. Adams, b. Lawson, 9, c. Martin, b. Lawson, 44; Lt./Col. L. L. Hoare, c. Adams, b. Lawson, 12, c. Lawson, b. Martin, 15; Capt. J. H. D. Sheppard, b. Adams, 16, c. Livock, b. Lawson, 9; Capt. G. R. S. Love, c. Pearce, b. Lawson, 8, l.-b.-w., b Lawson, 5; Lt./Col. H. L. Wethered, c. Lawson, b. Charters, 19, not out, 1; Capt. N. A. Knox, c. and b. Martin, 78; Capt. H. R. Skinner, b. Charters, 2; Col. H. C. Fernyhough, c. Livock, b. Martin, 15; Lt./Col. W. T. Sheppard, c. Charters, b. Adams, 4; Lt./Col. K. M. Body, c. Lawson, b. Martin, 4; Lt C. W. Symmons, not out, 0; Byes, 14; l.-b., 1—15; no-balls, 2; Total (first innings), 182; Total (4 wkts.), 76.

R.A.F., Halton.

The Annual Athletic Meeting was held on the Station Sports Ground on June 9, the results being as follows:—

Men's 100 Yards (Open): 1st, Sjt Rutley; 2nd, F/Sjt. Stubbs; 3rd, A. C. Foster; (Time, 11 seconds).

Boys' 100 Yards: 1st, L/Boy Thrower; 2nd, Boy Holdsworth; 3rd, Boy Soper; (11 3/5 seconds).

Men's One Mile (Open): 1st, Cpl. Clarke; 2nd, A C. Liddle; 3rd, A C. Cain; (4 mins. 46 secs.).

Boys' One Mile: 1st, Boy Moule; 2nd, Boy West; 3rd, L/Boy Yendall; (4 mins. 53 secs.).

Men's High Jump (Open): 1st, AC. Bollins; 2nd, Cpl. Kemp; 3rd, F/O. Vincent; (5 ft. 1 in.)

Boys' High Jump: 1st, Boy Cameron; 2nd, Boy Jones; 3rd, Boy Baker; 5 ft. 1 in.).

Men's 440 Yards (Open): 1st. Sjt. Rutley; 2nd, F/Sjt. Stubbs; 3rd, AC. Foster; (54¼ secs.).

Boys' 440 Yards: 1st, Boy Holdsworth; 2nd, Boy Drew; 3rd Boy Thorpe (56¼ secs.).

Boys' Tug-o'-War (Catchweight): No. 2 Section v. No. 1 Section; Winners, No. 1 Section.

Men's 880 Yards (Open): 1st, AC. Liddle; 2nd, F/Lt. Stevens, 3rd AC. Cain (2 mins. 15 1/5 secs.).

Boys' 880 Yards: 1st, Boy Hoare; 2nd, Boy Beck; 3rd, Boy Reep; (2 mins. 15 2/5 secs.).

Men's Three Mile (Open): 1st, AC. Southard; 2nd, AC Sheppard; 3rd, AC. Farrow; (17 mins. 6 1/5 secs.).

Boys' Three Mile: 1st, Boy Moule; 2nd, Boy Fahy; 3rd, Boy Beauchamp; (16 mins. 47 2/5 secs.).

Boys' Long Jump: 1st. Boy Watson; 2nd, Boy Floyd; 3rd, Boy Jones; (16 ft. 7 ins.).

Men's Long Jump (Open): 1st, AC. Bollins, 2nd, F/Sjt. Stubbs; 3rd, Sjt. Salter; (17 ft. 11 ins.)

Men's 220 Yards (Open): 1st, Sjt. Rutley; 2nd, F/Sjt. Stubbs; 3rd, AC. Pape; (22 1/5 secs.).

Boys' 120 Yards Hurdles: 1st, Boy Watson; 2nd, L/Boy Lawrence; 3rd, Boy Matthews; (18 2/5 secs.).

Boys' Putting the Shot: 1st, Boy Bowden; 2nd, Boy Matthews; 3rd, L/Boy Webb; (33 ft. 7¼ ins.).

Men's Putting the Shot (Open): 1st, AC Ray; 2nd, Sjt. Tilbury; 3rd, AC. Wood; (30 ft. 10¾ ins.).

Boys' Inter-Section Relay Race: No. 1 Section and No. 2 Section, 1st, No. 2 Section; (4 mins. 8 secs.).

Men's 120 Yards Hurdles (Open): 1st, AC Knight; 2nd, Sjt. Salter; 3rd, F/O Vincent; (17 3/5 secs.).

Men's Tug-o'-War (110 stone): No. 2 Section v. No. 5 Section; Winners, No. 2 Section.

Boys' 220 Yards: 1st, L/Boy Thrower; 2nd, Boy Holdsworth; 3rd, Boy Farmer; (23 secs.).

Men's Inter-Section Relay Race (Open) 1st, No. 4 Section; 2nd, No. 5 Section; 3rd, No 2 Section; (3 mins. 59 2/5 secs.).

Two Miles Walk (Open to Station): 1st, Cpl. Digby; 2nd, L/Boy Golightly; 3rd, Boy Beauchamp; (16 mins. 13 2/5 secs.).

Open Relay Race: 1st, R.A.F., Halton; 2nd, R.A.F., Uxbridge.

The prizes were distributed by Mrs. Barrington-Kennett who, at the same time, presented to No. 4 Section, who were the winners of the Winter Games Competition, the trophy named after her late husband.

R.A.F., Mediterranean.

H.M.S. *Ark Royal*: One hockey match has been played, in which a team from the ship defeated the Royal Fusiliers at Maidos.

H.M.S. *Pegasus*: A Whaler race between the R.A.F. Unit and the marines of H.M.S. *Calypso* took place on May 14, the marine crew winning by about 15 strokes.

No. 267 Squadron at Malta (Tennis): On May 26 the airmen of No. 267 Squadron defeated the Aukland Tennis Club from Sliema.

Cricket: The following are the results of the First XI cricket matches this season, up to date:—

May 3, v. H.M.S. *Iron Duke*: Lost—H.M.S *Iron Duke*, 255 for 9 wickets, F/Lt. M. A. Simpson 4 for 76; R.A.F. 145, F/Lt. H. Stewart 67.

May 15, v. H.M.S. *Ajax*: Lost—H.M.S. *Ajax* 94, F/Lt. M. A. Simpson 7 for 52, L/AC. Parkinson 2 for 6; R.A.F. 64, F/O. E. F. Waring 25; R.A.F. (2nd innings) 100 for 1, F/O. E. F. Waring 44, F/O. W. V. Simons 48.

May 16, v. H.M.S. *Centaur*: Won—H.M.S. *Centaur* 111, L/AC. Parkinson 4 for 54. F/Lt. Stewart 3 for 27; R.A.F. 173, F/Lt. T. W

May 17, v. H.M.S. *Iron Duke*: Won—H.M.S. *Iron Duke* 126, L/AC. Parkinson 4 for 54, F/Lt. Stewart 3 for 27; R.A.F. 173, F/Lt. T. W. Elmhirst, 70.

May 22 v. H.M.S. *Calypso*: Won—H.M.S. *Calypso* 60, F/Lt. Simpson, 6 for 30; R.A.F. 204 for 4, F/O Simons 52, L/AC. Hull 37 n.o. F/Lt. Stewart 70, F/O. Waring, 424 —

May 24, v. Military Staff and Depts.: Won—Staff and Depts. 101, F/Lt. Simpson 5 for 33, L/AC. Purnell 3 for 35; R.A.F. 17, F/Lt Stewart 70, F/O. Waring 42.

May 29, v. H.M.S. *Centurion*: Lost—H.M.S. *Centurion* 90, L/AC. Purnell 6 for 42; R.A.F. 79, F/Lt. Stewart 39 not out

May 31, v. H.M.S. *Egmont*: Lost—H.M.S. *Egmont* 136, L/AC. Purnell 5 for 57; R.A.F. 119, L/AC. Hull 36, F/Lt. Elmirsh 20.

The Second XI have played two matches, beating the Royal Army Service Corps, and losing to H.M.S. *Iron Duke's* Ship's Company.

[NOTE.—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* THE AEROPLANE *should in future be sent to the Secretary R.A.F. Sports Board, Air Ministry.*]

AIRCRAFT IN PARLIAMENT.

On June 1 SIR S. HOARE, SECRETARY OF STATE FOR AIR, in a written reply, stated that on the civil air transport lines subsidised by the Government for the year ended March 31 last, the flights numbered 4,000 miles, the miles flown totalled 778,000, and 11,460 passengers were carried; only one passenger was injured, and none was killed. He added that it will be clear from these figures that the percentage of accidents—namely, less than .009 per cent. of the passengers carried—showed that air transport was not unduly dangerous.

PERSONAL NOTICES.

DEATHS.

ROSE.—On June 13, at Yeovil, as the result of an aeroplane accident, P/O. James Barclay Rose, R.A.F., youngest son of Mr. and Mrs. Chas. M. Rose, Welwyn, Herts.

SAMSON.—On June 12, in London, Capt. William Leopold Samson, D.F.C., late R.N.A.S. and R.A.F., barrister, Middle Temple, eldest son of the late Charles L. Samson, of 121, Ashley Gardens, aged 41.

WARD, LINGWOOD, JARVIS AND SKUSE.—At Heliopolis Aerodrome, on June 18, as the result of a flying accident, F/Lt. Neville Byron Ward, F/O. Percy William Lingwood, AC. Jarvis and AC. Skuse, R.A.F.

ENGAGEMENTS.

HERRING-HIND.—The engagement is announced between F/O. Thrower Herring, R.A.F., late R.N., only son of Mr. and Mrs. A. H. Herring, of Petra, Weston-super-Mare, and Gladys Pretoria Hind, younger daughter of Mrs. Robert Hind, of Woodcliffe, Weston-super-Mare.

LONG—DE ROUGEMONT.—A marriage has been arranged, and will take place next November in Cairo, between Maj. William Dickson Long, younger son of the Rev F. Long, of Chatton Vicarage, Northumberland, and Beatrice Mary (Betty), only daughter of Mr. and Mrs. Arthur F. de Rougement, of 5, Gloucester Terrace, Hyde Park.

MACGREGOR—WALLACE.—The marriage arranged between Charles Stewart MacGregor, late R.A.F., India, now of Newcastle-upon-Tyne, younger son of the late Mr. and Mrs. John MacGregor, of Leith and North Berwick, and Mary Broün, only child of Mr. and Mrs. George Wallace. 120, Kendrick Road, Reading, will take place at St. John's Church, Reading, on June 23.

VINCENT—DERNER.—The engagement is announced of F/Lt. F. J. Vincent, R.A.F., second son of the late Mr. and Mrs. W. Vincent, of Halberton, Devon, to Gladys S. Derner, 11, Cornwall Mansions, Chelsea, daughter of the late Mr. T. M Derner.

MARRIAGES

DELACOMBE—MARKHAM.—On May 16, at the Parish Church, Staines, Roy Delacombe, M.C. (late Grenadier Guards), son of Lt./Col. Harry Delacombe, to Florence Eveline (Babs), only daughter of Mrs. Markham, of Staines, and the late Arthur Markham.

HENDERSON—BAIRD.—On June 12, Lt./Col. G. L. Piercy Henderson, M.C., A.F.C. (late R.A.F.), to Dorothy Kathleen Baird.

HURST—HOWARD.—On June 7, at St. Peter's Church, Bexhill-on-Sea, Robert John MacGeagh Hurst to Joan Mary Howard, daughter of Mr. and Mrs H. J. Howard, of 26, St. Leonard's Road, Bexhill-on-Sea.

JOHNSTON—MAYER.—On May 30 at the English Church, Gothenburg, Maj. Cecil Hubert Ralli Johnston, A.M.I.A.E., to Ellen Matina Elisabet Julia Mayer.

MACKENZIE-GRIEVE—BADDELEY.—The marriage was solemnised at Old Dibden Church, Hythe, Southampton, on Thursday, of Cmdr. Kenneth Mackenzie Grieve, A.F.C., R.N. (retired), and Miss Janet Clinton Baddeley, youngest daughter of Mr. and Mrs. Baddeley, of Dibden, Hants.

WRIGHT—CANE.—On April 14, at H.B.M. Legation and American Church, Teheran, George Robert Wright, of the Imperial Bank of Persia (late R.A.F.), eldest son of A. T. Wright, Esq., Bournemouth, to Marjorie, youngest daughter of Arthur Cane, Esq., Indo-European Telegraph Department.

BIRTHS.

ATKINSON.—On May 21, at Dunskaig, Ayr, to Nancy, wife of F/Lt. E. D. Atkinson, R.A.F., The Manor House, Upavon, Wilts—a daughter.

BISHOP.—On June 13, at 129, Wigmore Street, to Margaret, wife of Lt./Col. W. A. Bishop, V.C., D.S.O., M.C., D.F.C.—a son.

HOUSSEMAYNE-DU BOULAY.—On June 12, at a nursing home, the wife of Guy G. Houssemayne-Du Boulay, R.A.F.—a daughter.

LOWE.—On May 22, at 1, Acacia Place, N.W., to Ethel, wife of F/Lt. C. N. Lowe, M.C., D.F.C.—a daughter.

ODDIE.—On June 16, at Larchgrove, Balerno, the wife of F/Lt. Gerard S. Oddie, D.F.C.—a daughter.

PAGE.—On June 14, at Lymes Holme, Stanmore, to Mr. and Mrs. Handley Page—a daughter

PEARCE.—On June 3, to Maj. and Mrs. Denison Pearce (née Emmiline Hall), "Kelmscott," Wedley Park Road, Selly Oak—a daughter.

POWER.—On June 12, at a nursing home, Worcester, the wife of S/Ldr. D'Arcy Power, M.C., R.A.F., Medical Service—a son.

STEWART.—On May 21, at Cairo, the wife of S/Ldr. Douglas Stewart, M.C., A.F.C., R.A.F.—a daughter (still-born).

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COMMERCIAL AERONAUTICS.

The London Terminal Aerodrome.

AIR LINE ARRIVALS AND DEPARTURES.

ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 18; Tuesday, 19; Wednesday, 16; Thursday, ; Friday, 19; Saturday, 20; Sunday, 6.

ONDON—PARIS:

indley Page Transport, Ltd., machines 24, passengers 168, freight 18 lbs.; Air Union, machines 23†, passengers 27, freight 25,201 lbs.; tal machine 47, passengers 195.

ONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 22*, passengers 85 freight —.

ANCHESTER—LONDON—AMSTERDAM—BERLIN:

Daimler Airway, machines 35, passengers 68, freight —.

ERLIN—LONDON:

Aero-Lloyd, machines 0, passengers 0, freight —.

ONDON—ROTTERDAM:

K.L.M., machines 12, passengers 26, freight —.

SPECIAL MACHINES:

De Havilland Hire Service, machines 4, passengers 4.

Vickers, Ltd., machines 1, passengers 0.

Total number of trips by British machines: 86, carrying 325 pas.

oreign machines: 35, carrying 53 pas.

STATISTICS.

or week ending June 17:—

Machines, 121; Passengers, 378; Crews, 203; Total Personnel, 581.

orresponding week last year:—

Machines, 106; Passengers, 168; Crews, 135; Total Personnel, 303.

orresponding week, 1921:—

Machines, 91; Passengers, 300; Crews, 107; Total Personnel, 407.

orresponding week, 1920:—

Machines, 94; Passengers, 194; Crews, 117; Personnel, 311.

* These machines also carry loads of freight.

† Some machines are freighters only.

Croydon Notes.

Nearly 400 passengers travelled on the various routes last eek and the effects of the "Goliath" crashes would seem o have abated. It is stated that the finding of the Comittee which inquired into the fatal crash was that an inlet alve stuck on one of the Renaults which caused a back-fire hich ignited some petrol in a sump below the engine. This urnt through a main strut and caused the structure of the achine to collapse.

One is told that all the Renaults in the "Goliaths" are ow being exchanged for Salmsons, which seems queer. he Air Union tried to obtain some French Bristol "Jupiter" ngines but sufficient were not obtainable. The Salmsons eing of lower power than the Renaults will mean a poorer erformance and one doubts whether they are any more reable than the Renaults.

Mr. Frank Courtney has been flying for the Daimler Airay during the week. On Saturday he made a return trip o Amsterdam on G-EBBQ.

One is told that Sir Samuel Instone will not enter the .H.4a for the King's Cup Race this year. One recollects hat before the race last year he expressed the opinion that is handicap was too large and yet he won. One sincerely opes that this report is untrue as it would seem to be his uty to enter a machine this year under any conditions just o prove his sportsmanship. In most sports the winner of a ig race enters for the same race next year as soon as he has on. This year the first entrant is Mr. Harry Tate, who as at any rate been a member of the Royal Aero Club since 915.

Sir Sefton Brancker opened officially the new Trust House n Tuesday of last week. He said that the buildings on he aerodrome previously had made him ashamed and reminded him of Port Said. He hoped that in due course they would all be replaced with the exception of the new Trust House, which was the only adequate representative building on the aerodrome.

The grass is getting very long on the aerodrome and needs utting or else the D.H.34s, W.8bs and Goliaths will be getting lost when taxying.

On Tuesday Mr. Perry brought a Rolls-Royce D.H.9a back rom Brussels where the machine had been carrying out demonstration flights for the Aircraft Disposal Co.

Mr. Raynham passed through Croydon on Saturday *en oute* from Spain to Brooklands with the Vickers "Viking" G-EBED which he had been to fetch.

Mr. Donald Greig is again this year acquitting himself nobly t Lawn Tennis. He reached the final of the open singles at Beckenham which is a dress rehearsal for Wimbledon, nly being beaten by W. M. Johnson the great American. When he comes on to a court he is greeted with what at first seems to be hisses but on listening closely it proves to be the young ladies all saying "Isn't he sweet." He is undoubtedly England's hope for the championship singles and stands an equally good chance in the men's doubles in which he will play with Mr. Max Woosnam. In the mixed doubles he will make a strong pair with Mrs. Lambert Chambers. Everyone will wish him the best of luck on Monday next.—G. D.

Oxford.

The Midland Aviation Company paid a visit to Oxford from May 19 to June 11. During that time they carried 1,338 passengers without a hitch. Only one machine, an Avro, was used and a staff of only four was employed. This staff consisted of Mr. H. W. Barrett, proprietor; Mr. R. H. Leavey, pilot; a ground engineer and a lady assistant.

AIR MAILS.

The following notice has been received from the Postmaster-General:—

"The Postmaster-General and Secretary of State for Air have appointed a Committee with the following reference:—

"To consider the present arrangements for air mails and the possibilities for improving and extending them and for the co-ordination of the work of the General Post Office and the Air Ministry in connection therewith. Following are the members of the Committee:—

"Lt.-Col. J. J. C. Moore Brabazon, M.C., M.P., Chairman. Maj.-Gen. Sir W. Sefton Brancker, K.C.B., A.F.C., Director of Civil Aviation. Brig.-Gen. F. H. Williamson, C.B., C.B.E., Director of Mails. "Secretary: L. Simon, Esq."

"ALL THE WORLD'S AIRCRAFT FOR 1923

The 1923 edition of "All the World's Aircraft," which is the thirteenth year of issue, has just been produced by Sampson Low, Marston & Company. As for some years past it has been compiled and edited by C. G. Grey of THE AEROPLANE with the technical assistance of Capt. W. H. Sayers, who is now a recognised authority on all technical matters concerned with flying.

The arrangement of the book is practically identical with that of last year, that is to say, first comes the Historical Section which deals with the development of Military and Civil Aviation in all countries which are at all active in the air. This is followed by the Aeroplane Section, which deals with all the aeroplanes, gliders and helicopters the existence of which can be discovered. Then comes the Engine Section which similarly deals with all the World's aero engines. The last is a small section devoted to current airship work.

The book as a whole contains some 50 pages more of reading matter and nearly 100 illustrations more than did the 1922 edition. There is a noteworthy increase in the number of pages in the Historical Section. This is largely due to the development of aviation in the Baltic States each of which has now quite a respectable and well-organised air force.

There are some 25 pages more in the Aeroplane Section than there were in the 1922 edition and these include 50 more illustrations than in the previous year, 20 of these being represented by an increase in the number of gliders illustrated. It may be added that what are vulgarly called "motor-gliders" are included in their proper place in the Aeroplane Section. Those who are interested in the more strictly technical side will learn with interest that there are 35 more scale-drawings in the new edition than in last year's and that there are 20 more illustrations of engines.

It is to be noted that the book is almost entirely a new compilation. All aeroplanes and engines which have become obsolete or are no longer in current use have been deleted, so that the machines described are nearly all of 1922-23 production with the exception of some few which are still in current use in Civil Aviation. As the majority of machines in use by the Royal Air Force are now quite obsolete so far as production is concerned most of the R.A.F. types no longer appear but these have been replaced in the book (though not in the R.A.F.) by the latest designs in fighting machines which it is permitted to publish.

All told the book contains 435 pages containing 611 illustrations and 129 scale-drawings. Thus it will be seen that as a work of reference there is nothing in the World to compare with it and that it is in fact a standard work of reference for all who are concerned with aircraft. The price of the book as usual remains at two guineas and it can be obtained from THE AEROPLANE, 14, Bream's Buildings, E.C.4.

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Edited by C. Gray

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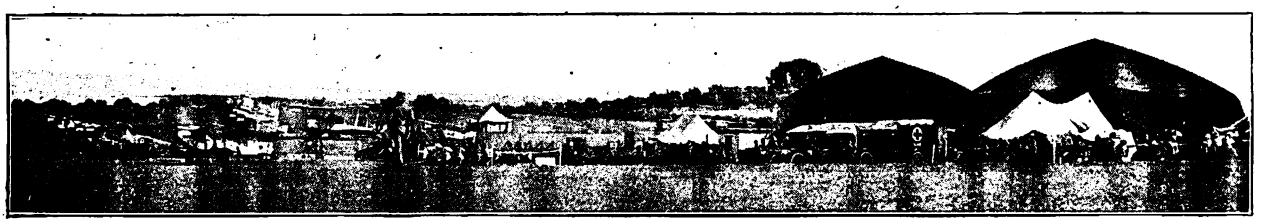

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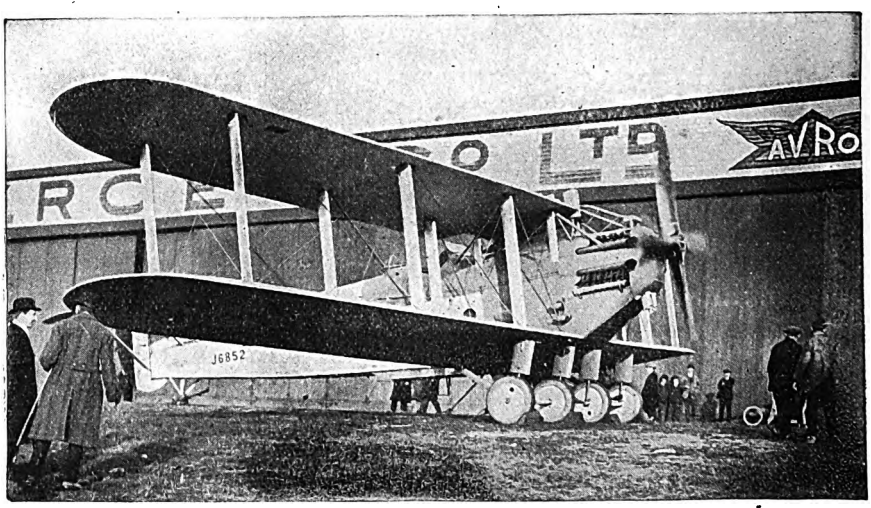

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ON THE EXPANSION OF THE AIR FORCE.

While this paper was going to press on Tuesday of this week the Government's representative was announcing to the House of Commons the long-expected increase in the Royal Air Force. This expansion should now bring us up to about a Three-Quarter Power standard so far as the actual numbers of our machines and personnel are concerned, though knowing something of the efficiency and quality of the R.A.F. personnel and matériel in that proportion represent quite comfortably a Two-Power Standard in fighting power. It is always just as well in these matters to recognise the fact that the Englishman never fights at his best unless he is fighting against what are apparently overwhelming odds.

Under the circumstances it is naturally impossible to give a report of the official announcement but having some little knowledge of the proposals it is possible to give a fairly accurate account of them.

The proposed increase is the result of the deliberations of the Special Committee of the Committee of Imperial Defence which has been sitting under the chairmanship of the Marquess of Salisbury to consider the question of Air Defence and of the relationship of the R.A.F. to the Navy and Army. The actual relations between the First Line of Defence and the Senior Services have not yet been decided but the Cabinet has definitely decided that the Air Force must be increased so that in addition to meeting the essential air power requirements of the Navy and Army and of Indian and Overseas commitments there must be a home defence air force of sufficient strength to protect us adequately against air attack by the strongest air force within striking distance of this country.

Precisely what striking distance means is of course open to question. To-day nothing further away than the Rhineland or the East of France or the southernmost points of Norway and Sweden can be accounted as being within striking distance but there is always the possibility that some day it may be possible to strike from and to the Russian frontier. And in any case we have to be prepared to defend ourselves by defending Western civilisation against the Orientals which may well mean basing our defensive air forces on aerodromes in central or even eastern Germany or in Switzerland.

The Air Staff has to prepare a scheme for the creation of such a home defence force organised in part on a regular and permanent military basis and in part on a volunteer or reserve basis but arranged so that sufficient strength will be available immediately for purposes of defence. Full use is to be made of civilian labour and facilities.

The first stage of this scheme is to provide for a strength of 600 first line machines. This does not mean merely orders for 600 aeroplanes but orders which will ensure 600 machines being available for first line operations on the outbreak of war and the maintenance of the first line at a strength of 600 machines while fresh supplies and further expansions are coming through the factories. At a most moderate estimate this means anything between 1,200 and 2,000 aeroplanes to be supplied as quickly as possible.

It is generally understood that the total extra expenditure is to be in the region of £8,000,000. Naturally this will have to be spread over two or more years for, as was indicated last week, it is almost impossible for the Air Ministry to spend on new machines the money which has already been voted for this year. Apparently the Contracts Department blames the Supply Department for delay in issuing specifications and the Supply Department blames the Contracts Department for the delay in issuing orders for machines of which the specifications were issued some time ago. In either case it seems improbable that the 1923-24 Vote will be spent this year.

Apart from the question of machines it is rumoured that there will have to be a preliminary expenditure of about half a million pounds on the purchase of land for aerodromes, on additional research work, on increase in recruiting machinery, on an immediate increase in the numbers of officers and other ranks, and on increases in the Air Ministry staff which despite hostile critics in the older Services is already too small for the work it has to do.

One gathers that the total expansion in terms of squadrons is estimated to be 34 new squadrons over and above the 15 new squadrons which were promised last year. There were at the beginning of last year 32 squadrons so that with the addition of 34 plus 15 we may with luck by the end of next year have the full 81 squadrons in being.

One hopes to deal in further detail with the official announcement next week or the week after. Meantime it is satisfactory to know that we are once more approaching the standard of a first-class air Power on paper though in justice to the R.A.F. and its Chief it must be understood quite clearly that as an effective fighting force the R.A.F. is to-day in spite of its small numbers still the greatest Air Power in the World.

—C. G. G.

ON THE GROSVENOR CUP RACE.

On Saturday last we had a foretaste of what the Sport of Flying may become with luck, if well handled by the Royal Aero Club and if a few (quite a few) fairly well-to-do young and middle-aged sportsmen begin to take an interest in the game. The start and finish at Lympne had much of the atmosphere and charm of a County point-to-point meeting. It was quite free from the circus element which always pervaded Hendon in the earlier days and from the seriously commercial air which seemed to over-hang the Croydon meetings. There was something of the good-fellowship which used to make the little prize-less meetings at Brooklands on Sunday afternoons before the War 1914-18 so attractive and at the same time there was just a shade more earnestness in the spirit of competition.

Lord Edward Grosvenor has done a very real service to British Aviation by putting up his challenge cup for aeroplanes of less than 150 horse-power, and it is to be hoped that next year we shall see some slight alterations in the rules which will induce people to build special machines for the race. There was some talk at Lympne about limiting the engine capacity in future races so as to confine the competing machines to the light aeroplane class vulgarly known as motor-gliders. That would be merely foolish, for it would be reducing what ought to become one of the "classic" air races to the level of a Brooklands motor-cycle meeting, or at best to the level of the motor-cycle "Tourist Trophy" race in the Isle of Man.

Any limitations imposed should be rather in the direction of producing a race analogous to the French "Coupe des Voiturettes" or the Tourist Trophy race for cars of limited capacity, the Aerial Derby for aeroplanes of unlimited power corresponding to the Grand Prix for automobiles. That would mean the production of small aeroplanes rather of the class of the "Baby" Avro and of the Austin "Whippet" but brought into line with the most modern ideas and designed up to the last word in high efficiency as the result of knowledge gained from the latest experiments with gliders and light aeroplanes at one end of the scale and the winged engines built for the Pulitzer Trophy and the Deutsch Cup at the other end. Then we should be making real progress towards a sporting aeroplane at a reasonable price.

It will be interesting to see what the Technical Committee and the Racing Committee of the Royal Aero Club evolve between them in the way of rules for next year's Grosvenor Cup race. As will be seen all the machines this year were in the class which horsey people describe as "aged" and some of the engines were qualified for inclusion in war-museums. Therefore the Committees have here an opportunity which has possibilities almost as great as the Air Ministry's opportunity to which one referred last week. The development of the sporting aeroplane affects the design of war aeroplanes almost as much as English horse-breeding affects the efficiency of the Army—and that will mean a great deal more in the next war than most people think. And if these Committees do their work well we shall all remem-

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ber that it was Edward Grosvenor who gave the first impetus to their work.

Preliminaries.

On the Friday evening before the race the competitors had arrived at Lympne without incident from their various homes at Croydon, Northolt, Brooklands, Hamble, and Bristol. The only absentee was Captain Stocken who was to fly Col. Barrett-Lennard's Avro. Rumour, lying heavily as usual, said that when tuning his machine two Le Rhône engines had burst into small pieces one after the other so great was the strain which he had imposed upon them. From Lt.-Col. the Aerial Darby one gathered that when about to start from Croydon on Friday evening a magneto had gone wrong.

That left nine competitors, each certain that his machine and engine were in perfect fettle, each certain that the handicappers had a personal grudge against him (which is always a sign that the handicappers have done their work impartially) and each certain that he could win if only his most dangerous rival would have the decency to strike a patch of bad luck. Certain competitors on Avros had removed the standard type bracing cables from their machines and had fitted streamline wires instead with the idea of increasing their speed. The wily handicappers were equal to this innocent guile and promptly added ten per cent. to their handicap just by way of "larnin' " them to be clever. This did not cause any ill-feeling and it did not affect the result consequently everybody was still pleased. So the party that evening at the Imperial Hotel at Hythe where all the competitors and officials were stopping was very cheery, though not so much so as to discommode in any way the eminently serious golfers who form the majority of the population of that excellent hostelry.

En passant, why is it that aviators always have a sense of humour and that golfists seem entirely devoid of it? "Chasing a quinine pill round a ten-acre lot" as an American called it, or "Hockey at the halt" as it was called by a brilliant flight-serjeant at Uxbridge, seems scarcely so serious as flying and yet it appears to produce a portentous solemnity of demeanour worthy of the precincts of a cathedral. Do all golfists suffer from hypertrophied livers or atrophied intellects?

However that has nothing to do with the race so let us to the start. Somebody has said "Happy is the nation which has no history" and in that way that start was happy. Nobody was late starting, everybody got off in the most impeccable style. The aerodrome arrangements made by Captain Glasson, now C.A.T.O. at Lympne and formely No. 1 at Croydon, were perfect. The Judge, General Brancker, who had come over in a four-seater D.H.9, piloted by Mr. Robinson, is still suffering from a damaged knee caused by an uneven aerodrome surface elsewhere, so he sat in a chair of state watching the proceedings with the eye of a connoisseur and the benignity of a Lord Justice. Despite his lameness Sir Sefton manœuvred with his usual alertness when necessary, as one humourist remarked "without the aid of net or balancing-pole."

There being practically no incidents to record one had best describe the machines which started so as to give some idea of what ought not to be entered for the Grosvenor Cup next year. There was a really interesting "review of ancestors," as the French call it.

The Starters.

The first away was Mr. Bert Hinkler on the ever-green "Baby" entered by Mr. A. V. Roe. The machine is certainly a post-bellum design and so far one knows of nothing existing which beats it for its power. But the design is now four years old and there is obvious room for improvement at this date. The real antiquity about it is the engine, the famous 35 h.p. four-cylinder water-cooled Green, which was designed somewhere about 1910 and was actually flying in 1911. Since then the engine has been improved in detail and throughout its career it has proved itself to be wonderfully reliable. Still it is difficult to believe that a thirteen-year-old design represents the last possibility in aero-engines.

Next went the ultimate winner F/Lt. Longton on Lt.-Col. Frank McClean's Sopwith "Gnu" with a 110 h.p. Le Rhône engine. He was accompanied by Leading Aircraftsman McLean, a mechanician of outstanding ability who has been with him on most of his big flights and has done wonders in tuning both machine and engine. The "Gnu" is also a post-bellum design, but it is merely a variant of all the war-time Sopwiths so that aerodynamically it belongs to the strut-and-wire box-kite period of 1910-1917 out of which we ought to have grown at least five years ago. And the Le Rhône engine, good and reliable as it has proved itself since it came into being in 1915, ought by now to be retired on a pension, or at best used by impoverished "joy-ride" firms.

The "Gnu-LeRhône" combination makes a very nice touring machine. It brought Mr. and Mrs. Longton and Mr. McLean and their luggage down to Lympne in comfort. It can be put down in any sort of cabbage-patch and it can get out of most ordinary fields. Also it is quite fast. But it is not an example of the sporting aeroplane as it should be in 1923, let alone in 1924.

The third starter was Mr. H. H. Perry, of Roumanian fame, on Lt.-Col. M. O. Darby's Avro with a 100 h.p. Bristol "Lucifer" engine. The machine was one of the streamlined efforts but had the ordinary Avro central-skid undercarriage. The starting of its engine caused the one untoward incident of the race. Mr. Perry's mechanic was swinging the air-screw when it sprung back and hit him on the head so that he had to be put to bed for the day. Mr. Perry appealed to the onlookers for a volunteer passenger and a gallant local lad who had never been in an aeroplane offered to go as far as Croydon where the pilot knew he could collect an A.D.C. mechanic to go the rest of the course.

In this machine the engine was of the most modern, for the "Lucifer" is Mr. Roy Fedden's latest completed work. One does not know of anything to beat it for its power and it is as simple and clean a job as one could wish. Naturally Mr. Fedden himself will produce something better in due course, but to-day it is as far as we have got. But the machine is merely the last of the war-time training types just streamlined a bit for extra speed.

The Owner-Pilot.

Following Mr. Perry went the ever-popular and ever-unlucky Mr. Fred Raynham, the first owner-pilot, on a perfectly standard Avro with the aft cock-pit covered just to streamline it a trifle. His engine was a 130 h.p. British-built Clergêt. He took it to pieces himself and fitted it into the Avro which he bought some time ago. The machine is in fact the war-time development of the old 80 h.p. Avro which Mr. Raynham first tested for A. V. Roe and Co. Ltd. in 1912 when the firm existed on the bounty of Mr. Humphrey V. Roe of Everett and Co. manufacturers of webbing and of the famous "Bull's-Eye Braces" in Manchester, when the stock joke was that Avro aeroplanes were dependent on Bull's-Eye Braces.

SOME PERSONALITIES AT LYMPNE.—Left picture :—Mrs. Longton, Mr Longton. Col. Frank McClean (the entrant of the winner), and Mr. McLean, Mr. Longton's mechanician. Middle :—Mr. Longton and Mr. Raynham. Right :—Maj.-Gen. Sir Sefton Brancker, Director of Civil Aviation.

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Diseñadores, por orden especial del Gobierno Británico del barco aéreo más grande que se ha construido para este gobierno.

Proveedores de todo lo necesario para servicios de transporte aéreo de pasajeros, correos y mercancías.

Diseñadores y constructores del tipo Fairey III. Serie de aparatos suministrados en grandes cantidades al Gobierno Británico, durante la guerra y *después de su terminación.* En esta serie de paratos, el fuselage, el plano central y la unidad de la cola, son de tipo normal y fabricados para adaptarse á diferentes tipos de alas, chassis y motores de otros aparatos de series que sean adecuadas para los fines particulares a que se destina el aparato en cada caso. Todas les máquinas de este tipo, tienen alas plegadizas y están provistas del dispositivo patentado de combeo variable Fairey que da una alta capacidad y potencia de ascensión combinada con una velocidad baja de aterrizaje.

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mally placed in a bicycle would start day after day for months without expostulation, absolutely refused to run. Almost everybody had a turn at swinging her little cricket-bat airscrews but the engine refused to fire. The Aeroplane's very own W. H. Sayers tried and did at any rate produce a back-fire which kicked one screw back into his hand. Fortunately the said hand being well hardened by writing solid technical articles in The Aeroplane was less fragile than the screw which had a piece chipped out of the trailing edge. Lt.-Col. Moore-Brabazon, M.P., one of the Stewards of the Meeting, who was watching the business felt all his old enthusiasm for mechanical things arise. He thought of his 1909 experiences with chain-driven Wrights and Shorts at Eastchurch and was with difficulty restrained from rushing into the melée and giving the engine some good hard turns.

Ultimately the engine consented to operate and Mr. Parker did some very pretty flying. It seemed that the machine was altogether abnormally sensitive fore and aft till Mr. Parker came down and explained his pressure feed had gone wrong so that all the time he was in the air he had been pumping up petrol pressure, and every time he pumped the pump with one hand he automatically pumped the control-stick with the other, which accounted for the machine having a motion something like that of a rocking-horse. Apart from that the machine gave a very good impression.

Meanwhile Mr. Wilson on the D.H.9, which had been General Brancker's taxi was busy taking up passengers three at a time. One gathered that D.H. Company charged the Royal Aero Club two guineas per trip and that the astute Mr. Perrin charged the passengers a guinea per head. Under these circumstances the Club may have made a trifle towards the expenses of running the meeting.

About 13.00 hours a Handley Page arrived from Croydon and from it emerged Sir Samuel and Lady Maud Hoare, the Duke and Duchess of Sutherland, and sundry other guests, accompanied by the one and only H. P. himself and a perfectly good head waiter. Large baskets, one labelled "Laundry," were desarcophagated from the fuselage and the official party were entertained to lunch by Mr. H. P. prior to crossing the Channel to the "Aerial Rallye" at Le Touquêt.

This little international courtesy on the part of our Air Minister and his earnest Under-Secretary will doubtless go far to allay the none-too-friendly feeling which exists among French aviation people towards Perfidious Albion. Apart from which the French being good Republicans will appreciate the visit by a real duke and a real baronet all the more because as their own stock of *ancienne noblesse* dies out they cannot create any new nobility and gentry.

A Point for Photographers.

Then most of us went back to Hythe for lunch, one's own particular need being to get some photograph films developed. And here one made a discovery which will be of use to aviation people who visit Lympne in future, especially during the forthcoming light-aeroplane competitions.

There are in Hythe a number of shops displaying the well-known sign "Kodak Supplies." In one they said that they developed films but could not be bothered doing so on a busy Saturday afternoon. In another they said they could do them by Tuesday but it was not worth while doing less than a dozen rolls of film at a time. In another they said they had to send them away to be done. True examples these were of English commercial enterprise.

Then at the very end of Hythe High Street, on the left going towards Folkestone just at the cross-roads, one discovered a real photographer, a Mr. Aldridge, who took in the couple of rolls exposed during the morning and had the negatives ready for the evening. And in the evening he developed a couple more rolls and had them ready on Sunday morning. So he and his very charming staff are to be thanked for the illustrations which appear herewith.

One commends Mr. Aldridge to the attention of all readers of The Aeroplane. Despite the triviality of the order nothing could exceed the courtesy with which it was received or the trouble which was taken over it. One hopes that when the big competitions are on in October they will provide enough work to show Mr. Aldridge a good commercial profit by way of recompense for his kindness on this occasion. At any rate he shall have all The Aeroplane's work.

News of the Race.

During the afternoon the wind switched suddenly from North to South by West. The Gnosspelicopter came out again and did some more flying. The Surrey Flying Services' G-EAIR Avro took up a lot of passengers. The D.H.9 was kept hard at work. Mr. Olley arrived on a Paris-bound Handley Page to pick up some passengers, and provided a contrast to the "Gnosspelicopter. And a few elusive and perhaps illusory messages came through about the race.

We learned that Messrs. Robinson and Britton were down somewhere between Tewkesbury and Worcester with engine trouble and would not continue. At which everybody was only sympathetic towards those two good sportsmen. We learned that Mr. Uwins had stopped because the oil-sump of his engine had come adrift and as an engine does not run well without oil we assumed that he also had abandoned the race. It was a pity for all would have liked to see what the "Taxi's" true performance was.

We also learned that Dr. Reid had turned back at Birmingham as he was hopelessly out of the hunt in the fight against the strong North wind which had been blowing all the morning. He drew more sympathy than anybody, for as an owner-pilot his sporting effort was much admired.

Then came the surprising news that Mr. Longton was still leading at Croydon on the return journey having done the 105 miles from Bristol in 62 minutes, showing that there must have been a strong West wind on that leg of the course. Also it was reported that Mr. Raynham was only a minute behind him and would obviously win if Major Foot who was rapidly making up his handicap time at Bristol did not catch him, all the others being well outside winning time.

The Finish.

After a wait of something over half an hour a biplane was sighted sliding down from 2,000 feet or so, where the clouds were coming from the North-West, at a terrific rate. The knowing ones said it was evidently Raynham's Avro. But as it hurtled into the aerodrome at well over a hundred an hour it turned into Longton's "Gnu." The women-folk by the winning-post embraced Mrs. Longton and the men thumped Col. McClean on the back for it was as popular a win as could be.

Raynham's win would have been just about as popular, for he has been a wonderful trier and a still more wonderful loser. But Longton's win meant success to three very sporting people who have tried as often and as unsuccessfully as has Mr. Raynham. So now all we can do is again wish him better luck next time. At any rate he gets £50 for his trouble.

Mr. Longton landed beautifully and taxied up to the rails where he was received with acclamation. As he and Mr. McLean were decanting themselves from the machine Mr. Raynham came in, evidently going slowly. And he also was given an ovation.

Then Mr. Bert Hinkler sailed in, his engine ticking like a small sewing machine. He had been delayed 15 mins. at Bristol because his engine refused to start. Following him came Dr. Reid, on his way home to Canterbury but unfortunately out of the race. After a few minutes Mr. Hamersley arrived and sat his Avro down at nothing an hour, wagging his rudder vigorously in the approved Gosport style. And last of all arrived Mr. Perry.

Incidents.

Mr. Longton reported that his only trouble was a sticky valve-stem at Bristol, which was persuaded with emery, and an oily plug, which was replaced. Mr. Raynham ascribed his loss of the race to a defective oil-pump, which caused his engine to overheat for lack of oil. Mr. Hinkler had had no trouble. He was merely beaten by the head wind on the long stretch to Birmingham.

Mr. Hamersley said that his "Lucifer" engine had, in the American phrase, "had the full gun" all the way round the course and had not given a moment's trouble. He did not win because his aeroplane did not go fast enough to beat the handicappers.

Mr. Perry had spent three-quarters of an hour in a field ten miles out from Bristol replacing a broken bolt which had let loose all the valve-gear of the top cylinder.

After that Lord Edward Grosvenor's two little girls assisted by General Brancker presented the Cup to Col. McClean and Mr. Longton and the local crowd were duly impressed at seeing these two old grey-headed men going up to receive the prize in so big an adventure as an air race. Lord Edward, who is the worst speechmaker in the world bar one, said he never made a speech, and didn't. And the crowd went.

A Sorrowful Ending.

The aviation people were just arranging about meeting at Lord Edward's dinner-party that evening when General Brancker made known very quietly the news of poor little Foot's death. Naturally none of us felt like spending a joyous evening after that, for everybody who knew Foot was genuinely fond of him. So all agreed to wash out the party. Lord Edward sent the material of the dinner across to the aerodrome where the mechanics of the R.A.F., who worked like slaves all day as usual, and the mechanics of the various firms, had a first-class feast. The rest of us returned sorrowfully to Hythe, the enjoyment of a very nearly perfect day being overshadowed by the loss of one who if he had come through would have been the life and soul of what promised to be a very merry evening.

Still, little Foot himself would be the first to say that considered as an air race the whole show was a very great success, for which Lord Edward Grosvenor deserves the fullest credit as the promotor. In the hotel one overheard a non-aviator say "It's a pity about that nice young fellow. It

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makes one wonder whether these competitions ought to be allowed." The answer is simply that deaths in the hunting field or motoring or bob-sleighing or mountain-climbing do not stop the sports with which they are concerned.

We are only at the beginning of the Sport of Flying. And there are many deaths worse than being killed in a game one enjoys especially when making up time on the leaders from the scratch mark. Which thing is an allegory.—C. G. G.

THE RACE AT CROYDON.

The first arrivals at Croydon were F/Lt. Longton and Mr. Bert Hinkler who came in almost together about 10.45.

Corporal Blake with a keen little party of a dozen R.A.F. men from Kenley assisted with the machines and made themselves generally useful in filling up, running messages, etc. Everything they did was done with the smartness characteristic of the Service.

The next machine should have been that of Rex Stocken but unfortunately he broke an oil-pipe on the previous day. This machine was entered by that good sportsman Lt.-Col. Barrett-Lennard. He was quite naturally disappointed especially as he had had bad luck in the King's Cup race last year. Mr. Perry came in next and after him Mr. Raynham and S/Ldr. Robinson came in almost together.

Mr. Raynham was very low down and said that he had seen the P9 apparently getting in some soaring practice (though on the wrong side of the hill), near Sevenoaks. S/Ldr. Robinson on arrival at once proceeded to instruct the officials in the correct manner of carrying out their duties.

F/O. Hamersley arrived next with a broken wire, which he eliminated as no one else was allowed to help. Soon after him came Dr. Whitehead Reid, one of the little band of Old Tonbridgians who is unable to keep away from aeroplanes. Dr. Reid was M.O. of an R.A.F. station near Heliopolis and was taught to fly in his spare time by Mr. MacIntosh of H.P.T. He has several machines of his own at Bekesbourne, near Canterbury. After him came Mr. Uwins with Mr. Suddies in the Bristol training machine.

All these machines departed after their official half-hour's wait and some time after they had gone came Major Foot on the Bristol. As usual he had a cheery word for everyone.

In the interval Capt. Rex Stocken did some pretty flying on a D.H.9 belonging to the Aircraft Disposal Company.

In the afternoon the aerodrome was decorated by the presence of two Naval Lieutenants in full dress, cocked hats, lamp-shades on shoulder and everything as fitted. It was thought to be a compliment to Sir Sam Instone who was present, though not, of course, as an entrant.

F/Lt. Longton was the first to arrive in the afternoon, getting in at 15.41 hours and Mr. Raynham was second. Some twenty minutes later Mr. Hinkler arrived.

Everyone thought it was a sure thing for Mr. Raynham and the B.P. people, on whose petrol he was running, got ready to hoist flags. The news of Mr. Longton's win however caused cheers from Mr. Jerry Shaw of "Shell" who declares that Mr. Raynham cannot win without a change of spirit. Whether Mr. Raynham's "hoo-doo" is a spirit or a sparking plug or what one does not know. It hardly seems to be one of these as it follows him even to "motor-gliders without motors."

Dr. Reid came in about this time having returned from Birmingham. His machine was handicapped to do about 90 m.p.h. whereas it did not in fact with its 80 h.p. Renault do much more than 65 m.p.h. One hopes that he will receive better treatment from the handicappers in the King's Cup race and the Aerial Derby for both of which he hopes to enter.

Mr. Perry reached Croydon soon after and then came the terrible news about Major Foot. At Croydon where he was known so well the news was received with great sorrow and all who knew him felt his loss very deeply.—G. D.

POTENTIAL ENERGY?

The only point of serious technical interest raised by the race for the Grosvenor Cup is the surprising performance put up by Mr. Raynham's Avro. In the early days of flying there was a saying current at Brooklands that certain individual pilots were worth an extra 10 h.p. to any machine. If Mr. Raynham can persuade a 130 h.p. Clergêt to drive a standard Avro over 400 miles at an average speed of 96 m.p.h. he personally must be accounted as worth a good deal more than 10 h.p. particularly when it is remembered that he cruised home from Croydon with a broken-down oil pump.

His flight is to be regarded as a really remarkable achievement, and is proof—if proof were required—that the individual knowledge and experience of the pilot is even to-day not a negligible factor in determining the performance which can be obtained from a given machine.—W. H. S.

PILOT.	MACHINE.	H'CAP.	STARTING TIME.	CROYDON.	CASTLE BROMWICH	BRISTOL.	CROYDON.	LYMPNE. FINISH.	FLYING TIME. (a)	SPEED M P.H. (b)	PLACE
HINKLER	Avro "Baby" (35 h.p. Green.)	1-34-20	10-00-00	Arr. 10-44-55 Dep. 11-14-55	Arr. 12-47-09 Dep. 13-17-15	Arr. 14-15-24 Dep. 14-25-24	Arr. 16-02-51 Dep. 16-32-51	17-09-47	5-04-47	79-7	3
LONGTON	Sopwith "Gnu" (130 h.p. Clerget)	1-31-39	10-02-41	A. 10-44-25 D. 11-14-29	A. 12-42-36 D. 13-12-36	A. 14-10-01 D. 14-40-01	A. 15-41-19 D. 16-11-19	16-40-47	4-36-06	876	1
PERRY	Avro (100 h.p. Lucifer)	1-30-24	10-03-26	A. 10-51-28 D. 11-21-28	A. 13-01-03 D. 13-31-03	A. 14-24-15 D. 14-54-15	A. *16-44-17 D. 17-14-17	17-51-55	5-48-29	67-7	5
REID	S.E. 5A (80 h.p. Renault.)	1-15-37	10-18-43	A. 11-14-45 D. 11-45-52	A. 13-52-22	Abandoned r	ace and retu	rned to Croy	don.		
ROBINSON	P.9 (60h.p. R.A.F.	1-05-26	10-28-54	A. 11-10-40 D. 11-40-40	A. 13-03-04 D. 13-33-04	Landed at T	ewkesbury.	Engine trou	ble.		
RAYNHAM	Avro (130 h.p Clerget.)	1-1-11	10-33-09	A. 11-10-50 D. 11-40-50	A. 12-57-03 D. 13-27-03	A. 14-17-20 D. 14-47-20	A. 15-43-25 D. 16-13-25	16-44-38	4-11-29	96-1	2
HAMERSLEY	Avro (100 h.p. Lucifer.)	0-59-23	10-34-57	A. 11-20-45 D. 11-53-13	A. 13-22-12 D. 13-52-12	A. 14-48-41 D. 15-18-41	A. 16-20-53 D. 16-50-53	17-21-05	5-41-08	71-2	4
UWINS	Bristol "Taxi" (100 h.p. Lucifer.)	0-45-37	10-45-43	A. 11-25-48 D. 11-55-48	A. 13-10-06 D. 13-40-06	Landed at T	ewkesbury.	Engine trou	ble.		
FOOT	Bristol Monoplane (100 h.p. Lucifer)	Scratch	11-34-20	A. 12-04-48 D. 12-34-48	A. 13-36-10 D. 14-06-10	A. 14-49-31 D. 15-19-31					

* 45 minutes' delay near Bristol owing to broken valve fulcrum pin.

(a) Gross Time less 2 hours' stopping at controls. (b) Approximate Distance taken as 405 miles,

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MAJOR E. L. FOOT, M.C.

I can think of no one in the whole of the Aircraft Industry whose death seems harder to bear or who leaves a bigger gap in the order of things. Major E. Leslie Foot, M.C., was known to all and sundry by the name "Feet" and when a man has a nickname that is used almost universally it means that he is generally regarded with affection. And Feet was certainly loved by all. If he had any enemies I have not heard of them.

I first remember Feet in France with the R.F.C. either late in 1915 or early in 1916. If my memory is right he used to fly the scout in a B.E. or Vickers squadron for in those days there were no complete scout squadrons but, until the advent of Major Hawker's "24" of D.H.2s, each squadron had one scout attached.

He was then transferred to 60 squadron which was I believe the first tractor scout squadron and was at the time commanded by the late Major "Ferdy" Waldron. In this squadron Feet flew the first Spad in the R.F.C. It was with this squadron in the early days of the Battle of the Somme that he won the Military Cross.

In November or December, 1916, he came home and was posted to Gosport as fighting instructor as the result of his demonstrations of stunt flying before a certain high officer of the R.F.C. Feet was without question the originator of stunt-flying as at present known. Previously at Gosport and elsewhere the whole aerodrome would turn out to watch an extra bold pilot do a timid loop. Feet with an Avro, a Bristol "Bullet" and a Vickers-Barnwell "Bullet" used to roll, spin and loop continuously and he completely revolutionised flying as then known.

He was undoubtedly the originator of the famous "Gosport flying." In those great days Feet helped many less experienced pilots by his knowledge. He was always willing to give information when asked though he would never thrust it on us unasked. Always at a request from a pilot, no matter how much junior, he would be up in the air for a practice scrap and unlike many instructors never considered himself too superior to consort with his pupils.

Later on he went overseas again with the famous 56 squadron and I lost touch with him until after the war.

On the opening of Civil Aviation he joined Handley Page Transport Ltd. and made a flight on the day that Civil Aviation first began, all along the South Coast delivering newspapers by parachute. That was in August, 1919. He remained with H.P.T. until the end of 1920 when the line temporarily closed down.

During this period he took Mr. Handley Page on his first flight and for some six weeks he ran the H.P. service to Amsterdam with D.H.4a G-EAVL practically unaided. He made a trip to Pau with this machine. When H.P.T. closed down Feet took on a job with a novel sparking plug firm but his heart was in aviation and he soon gave this up and took up odd jobs delivering machines to various parts of Europe for the Bristol Company and the Aircraft Disposal Company.

He told me about this time that he could not afford to carry on without a regular job and unless something turned up he would have to give up flying. I remember that he added that he would rather die than give up aviation which was the only man's job left in England. Fortunately he was reappointed to Handley Page Transport last summer and until April this year he flew continuously for them.

He married last year and this event steadied him considerably and increased his value as a pilot an hundredfold.

In April this year he joined the Bristol Aeroplane Company as test pilot and as instructor to the R.A.F. Reserve.

To that dear lady, Mrs. Foot, who has come to be regarded with as much affection as was Feet himself, all his friends will give their loving sympathy in her very terrible bereavement, and also to his mother.

Capt. C. A. Lewis of the British Broadcasting Company, who served with Feet in France, perhaps paid him the best tribute when announcing the sad event on Saturday night from the London station. He said simply: "He was one of the best and bravest men I ever knew." What better could be said of any man by a fellow fighting pilot?

The cause of the accident is not at all clear. He was flying the original Bristol monoplane built in 1916 and since fitted with a "Lucifer" engine. Eye-witnesses say that he was flying at about 200 feet when the left wing broke and the machine crashed onto a road and caught fire. He was no doubt killed outright by the fall. Either of two events seems possible. He might have been considerably lower than 200 ft., flying low so as to waste no time and he might have hit a tree though it seems more probable that something went wrong in the machine.

But it could not have been an error of judgment. Feet would never have come to any harm through a fault of piloting. Of that I am sure.—G. D.

JEAN CASALE.

On Saturday, June 23, M. Jean Casale was killed at Vieuville Wood, 5 miles N. of Grandvilliers (Oise).

He had flown from Buc to Le Touquêt on the new Blériot four-engined biplane with M. P. E. Flandin, the former French Under-Secretary of State for Air, and now President of the French Aero Club, and Mme. Flandin in connection with the "Aerial Week-end" held at Le Touquêt and was returning to Buc to pick up M. and Mme. Blériot.

Whilst over Damérancourt at a height of 2,000 ft. the machine was seen to fall, and on reaching the wreck they found M. Casale lying dead under the petrol tanks of the machine with his skull fractured and both legs broken.

His mechanic, who was dazed, but practically unhurt, attributes the accident to a jambed elevator-control, but before he could render any assistance to M. Casale whom he saw struggling to free the control-wire the machine crashed into the trees of Vieuville Wood.

With the death of Jean-Hyacinthe Casale, France loses one of her most brilliant aviators. There were certain men who in France competed for the supremacy of the Air and will remain an immortal memory. To the names of de Romanet, Poirée and Deullin who fought brilliantly during the War and gave their lives for France in the furtherance of civil aviation one must now add Casale.

M. Casale was born in Corsica in Sept. 1893, and took his French Aero Club certificate No. 1964 on May 15, 1915, on a Maurice Farman biplane. During the War he was officially recorded to have brought down 10 enemy aeroplanes.

Immediately after the War he joined the Nieuport firm and put up a whole series of height records, and his record of 10,100 m. made on June 14, 1919, still stands in France. In 1920 he joined Blériot-Aeronautique and has flown continuously for them ever since. On Feb. 28, 1920, he broke the World's Speed Record with 283.46 km.p.h. (177 m.p.h.)

This year he again turned his attention to height records and carrying useful loads of 250 kgs. and 500 kgs. he reached heights of 7,200 m. and 5,000 m. respectively whilst flying the Spad 56, the first French machine to be fitted with the French-built Bristol "Jupiter" engine. Even as recently as June 1 he reached a height of 5,600 m. carrying a useful load of 1,000 kgs. on the Blériot "115," the machine upon which he met his death.—L. B.

FLYING TO THE PAGEANT.

In notice to Airmen No. 45 of the year 1923, dated June 19, the Air Ministry warns civil aircraft not to land at Hendon if the passengers want to see the Pageant but to go either to Stag Lane or Cricklewood.

This is utterly futile. There is heaps of room for an odd Avro to land and personally one has always gone that way except in the first year. The whole object of going by air is to avoid the congestion near the aerodrome. Once one is as far away as either Stag Lane or Cricklewood the going is quite good by road.

This notice as it stands is merely grandmotherly. It would have been all very well to prohibit landings after the official performance had begun. Surely people ought to have been encouraged to arrive by air up to 15.00 hours. But if civil machines are to be prohibited will the Air Ministry also prohibit R.A.F. photographic machines which distract attention from the serious flying?—G. D.

THE AIR CONGRESS.

The proceedings of the International Air Congress were opened officially by His Royal Highness the Prince of Wales on Monday last, June 25.

As THE AEROPLANE goes to press on Tuesday of each week it is impossible to report in this week's issue any more than the mere fact that the Congress has been officially opened. It is hoped next week to give something like a full catalogue of the various papers which have been read and of their contents and to record in a general way the proceedings of the Congress.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING AERODYNAMICS, AIRCRAFT FINANCE AND COMMERCIAL AERONAUTICS AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER.

THE WEEKLY COMMENTARY.

With the advent of the low-powered aeroplane, interest n the glider appears largely to have evaporated. A ament on this subject appears below.

The Parnall " Plover "—one of the most recent British lesigns of single seat fighter—is illustrated and described n this issue. Unfortunately owing to official requirements as to secrecy no details of equipment or of performance can be given.

The satisfactory trial flight of the Parnall " 'Possum " —the first British-built machine with a central engine-room and gear-drives to twin airscrews—is recorded on page 484.

A process by which a coat of metal of any desired thickness may be " painted " upon the surface of almost any material has certain every obvious uses for aeronautical purposes.

A description of the Schoop metal-spraying process, which has already been used for aircraft work, will be found in this issue.

THE FUTURE OF GLIDING.

The original intention underlying the offer by the Duke of Sutherland of a prize of £500 for a low-powered aeroplane was the development of a type of machine which would be sufficiently cheap to allow young men of strictly limited means to take up the sport of flying.

The Sutherland Prize and Soaring.

At the time when the prize was first announced it was generally supposed that within the limits of engine-power permitted it would scarcely be possible to do more than just fly, and that if such machines were to make flights of any appreciable extent they would have to avail themselves to a considerable extent of any assistance that could be gained from up-currents, reserving their engine as an auxiliary to helping them across tracts of country where no such aid was forthcoming.

Hence the Editorial Editor's *bête noir* the term " motor-glider," which is incidentally really only open to objection on the ground that it is indefinite and is properly descriptive of every engined aeroplane.

Hence also the provision in the rules governing the contest that the start in the competition shall be made from a hill, and that one leg of the triangular course over which the contest is to be held shall be parallel to a range of hills.

Experience has since proved that machines well within the limits of engine-capacity allowable can fly quite strongly without the aid of up-currents and it has become the general opinion that pilots flying for any of the petrol-consumption prizes will choose the calmest possible conditions for their flights—and will make no effort whatever to save petrol by soaring.

It will not be possible to soar along the ridge unless there is a fairly strong wind. On at least one leg of the course the pilot will have to fly against that wind, and it is felt that more petrol will be lost on the up-wind leg than can be gained on the hill-side leg by soaring.

The Choice of Lympne Aerodrome.

The competition therefore is to be held at Lympne Aerodrome, and not on Itford or any similar ground. Lympne Aerodrome is on the top of a hill, and the rule aforementioned is therefore complied with. There is at Lympne an admirable ridge which in a South-west wind should greatly help lightly-loaded machines to rapidly acquire a fair amount of height at the expense of wind-energy. But the conditions, although they should certainly permit of some soaring are not such as to favour the motor-aided soaring machine, and there is very little doubt that no particular advantage is to be obtained on that ground by any attempt to help out the engine in this way.

There was at one time a proposal that at least one or two prizes for gliding should be offered for competition at the meeting for the Sutherland Prize contest. This proposal however has been dropped as a result of the choice of Lympne as the place of contest. The ridge aforesaid at Lympne would afford an excellent starting-point for a straight glide to the S.E., but would be unpleasant as a soaring ground owing to the accidented nature of the ground at its foot, and to the presence there of a tree-lined military canal.

On the other hand no suitable soaring-ground which also provided shed accommodation, fuel and oil supplies, etc., and a really good getting-off surface for low-powered machines was available, and therefore the engineless glider has had to be relegated to the background.

The Selfridge Prize.

In many ways this fact is to be regretted. There is it is true the Selfridge prize still to be won—but this particular contest calls for a considerable expenditure on the part of anyone who wishes to attempt it, with comparatively small chances of obtaining any reward. Any sort of a glider competition at an organised meeting would pretty certainly have produced a few entries, and some of the entrants would equally certainly have made an attempt at covering the 50 miles necessary for the Selfridge contest.

As it is nobody is likely even to build a machine for it. And in view of the very excellent sport provided by the Itford meeting, and of the number of very important problems raised by that meeting it will be thoroughly regrettable if gliding is permanently to retire into the background again.

The Value of the Glider.

Immediately one passes from the glider to the engined-machine the temptation which overwhelmed the earlier aeroplane designers reasserts itself. Given an engined-machine whose performance it is required to improve, one has two alternatives, one to improve the machine, the other to put up its power. And the second alternative is so much the simpler that it has almost invariably been followed in the past. If it is followed equally in the future, the brief recrudescence of the glider will certainly have given aeroplane design a new start, but it will have failed of its full possibilities.

For if a glider is unsatisfactory one has no alternatives—the machine is the only thing one has that can be improved.

For this reason the glider ought not to be allowed to die, and the scheme which has been before the Royal Aero Club for some time without any evident progress—for the establishment of a headquarters available for those who wish to glide—should be reconsidered and action should be accelerated. A sum of money sufficient to give the scheme a start is it is understood at the Club's disposal.

If reasonable accommodation at a suitable place is provided in the near future it is believed that more than one glider would be put in hand at once. But if the matter is allowed to remain in its present conjectural condition most of those who would like to glide will abandon hope and gliding will come to an untimely end.

[The choice of Lympne seems to rest on gastronomic rather than aerodynamic reasons. Lord Edward Grosvenor is a most hospitable person and there are hopes of Sir Philip Sassoon when he returns. So presumably the loudest voices on the Committee voted for Lympne.—C. G. G.]

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THE PARNALL 'POSSUM ON TEST.

The Parnall " 'Possum "—illustrated in this paper of June 13—was satisfactorily flown in preliminary tests at Bristol by Capt. Norman McMillan on Tuesday, June 19, and thus becomes the first British-built central-engine gear-driven multi-screw machine to fly.

The " 'Possum," it may be remembered, is a single Napier-engined triplane, with two airscrews mounted one on each side in the central wing and gear and shaft-driven from the central engine. The transmission gear—which weighs about 1 lb. per h.p. of the engine output—is the result of a large amount of work on the part of Mr. Harold Bolas the designer, and represents a distinct advance on previous mechanisms of the same type.

The " 'Possum " is a three-seater equipped with machine guns, wireless and photographic equipment. Oxygen equipment for altitude flying is also provided, and arrangements have been made to permit the crew leaving rapidly by means of parachutes in an emergency.

The machine is also fitted with a somewhat novel method of steering on the ground. There is no tail skid, but instead an orientable rear wheel coupled up to a steering control. This wheel is almost entirely enclosed within the fuselage. In order to allow of pulling up in a short space brakes are fitted to the landing wheels

As the central engine is arranged to be started from the cockpit, the machine can be started up, and handled on the ground without external assistance—a very useful feature indeed for both military and civil purposes.

The " 'Possum " is officially described as a " Postal " class aeroplane and the details of her equipment suggest that adequate precautions are to be taken against the possibility of the " holding up " of aerial posts.

THE SCHOOP METAL-SPRAYING PROCESS.

The Schoop process of metal-spraying, whereby a homogeneous coating of practically any desired metal may be formed upon any surface is not unknown in this country but so far as can be discovered the process was only described in certain Technical journals at a very early stage in its development. Certainly its possibilities for certain types of aircraft work do not seem to have been ventilated in this country.

The process owes its origin to a Swiss engineer Max Ulrich Schoop of Zurich who over 12 years ago was struck by the manner in which a lead bullet fired at a hard metal plate sprayed and formed a thin adherent lead coating on that plate, and was thereby led to consider whether it was not possible to devise a somewhat similar method of coating metal objects with a protective coating of for example tin or zinc.

The first test made employed a small cannon which fired granulated tin and lead at steel plates. As a further step molten metal from a crucible was sprayed on the plates by a jet of superheated steam or compressed air at very high pressures of from 35 to 40 atmospheres.

It soon proved that these very high pressures were unnecessary and the working pressure for spraying has been reduced in successive stages until now pressures of three atmospheres (45 lbs./sq. in.) only are necessary.

In the earliest practical stages of the process powdered zinc, which is commercially available at quite low prices was projected by a jet of air through a Bunsen flame concentric with the jet. The granules in passing the flame were rendered plastic and on hitting the metal to be coated, rose in temperature sufficiently to flow and to weld up to adjacent particles and to the plate itself.

The granulated zinc was then replaced by a wire of the metal required to be deposited which was mechanically fed through the flame and atomised by an air-jet when molten.

Originally an oxygen coal gas, or an oxy-hydrogen flame was used. Better results were obtained by the use of acetylene, and finally an electric arc maintained between two wires of the deposited metal was used. This latter arrangement made it possible greatly to increase the range of metals which could be deposited, and it is even possible to use platinum and tungsten in this way.

Very compact and handy metal-spraying " pistols " of a size and appearance somewhat similar to those used for spray-painting have now been produced to deposit metals by the Schoop process. These are available both for oxy-acetylene and electrical heating.

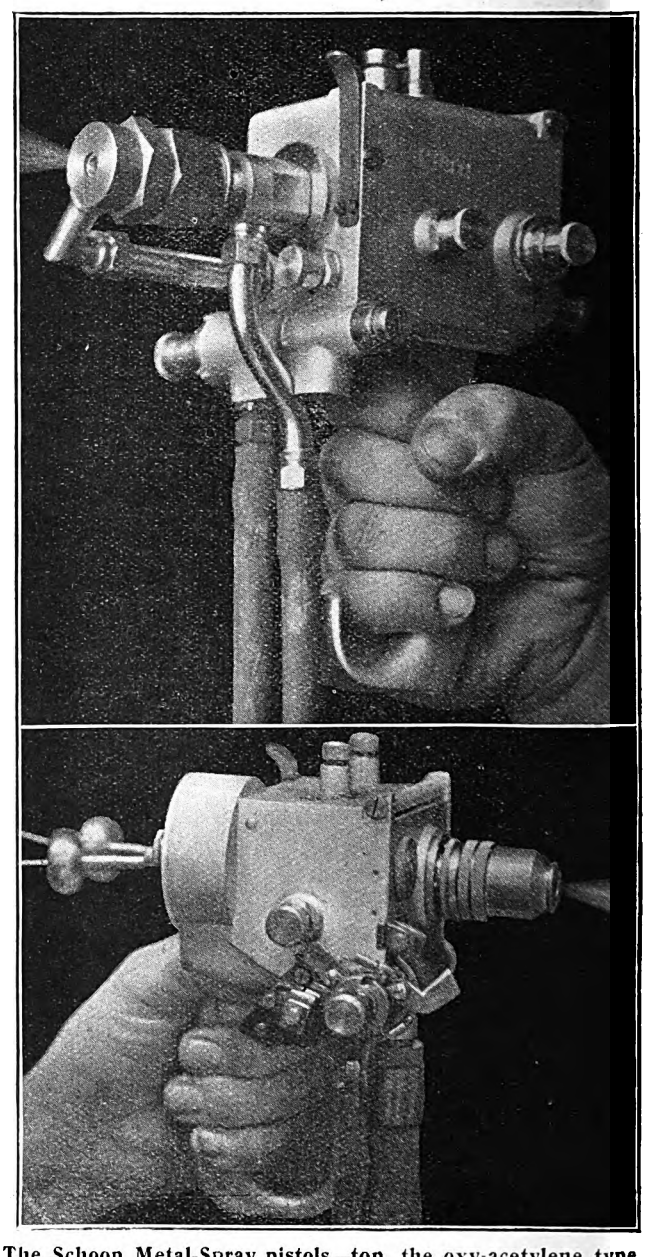
In the electrical pistol two wires of the metal to be deposited enter the rear of the pistol through insulated guides and are connected to electric supply leads at a pressure of 40-50 volts.

A trigger-controlled switch on the handle of the pistol allows the worker to start or stop an arc between the end of the two wires. Once the arc starts the two wires are fed forward by the action of a small Pelton wheel operated by an air-jet and appropriate gearing in such a way as to maintain the arc in its correct position in the spraying-nozzle, and a second jet of air pulverises and ejects the molten meal in the form of a spray.

In the oxy-acetylene pistol one wire only is fed into the centre of an oxy-acetylene blow-pipe flame by a similar Pelton wheel arrangement.

The development of this process to its present stage of efficiency has involved an enormous amount of work and experiment. In the early stages of the process only about 30% of the metal passing the flame ever reached the object to be coated, the rest becoming oxydised and giving rise to clouds of dense smoke. To-day quite 90% is deposited and in the case of aluminium about 94 to 96% of the metal is usefully employed.

The precise action which occurs in this metal-spraying process is obscure and the subject of some controversy. The metal leaving the nozzle is undoubtedly on the point of fusion, and one would naturally expect oxydisation sufficient to prevent the forming of an homogeneous layer on the coated object. Also one would expect that in order to secure adequate adhesion to the plated sheet the latter would require to be very perfectly cleaned and in addition raised to a high temperature. In fact oxydisation does not interfere



The Schoop Metal-Spray pistols—top, the oxy-acetylene type, below, the electric type.

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THE West Country of England is famous all the world over as the land of poetry and romance. From time immemorial poets and bards have sung of its beauties. All around can be seen monuments of the past such as Stonehenge, Glastonbury and Sedgemoor and yet living in a past as it were we are living in a future when Air Transport will some day be just as real as Stonehenge or Glastonbury. The West Country has made history and is still making history in making

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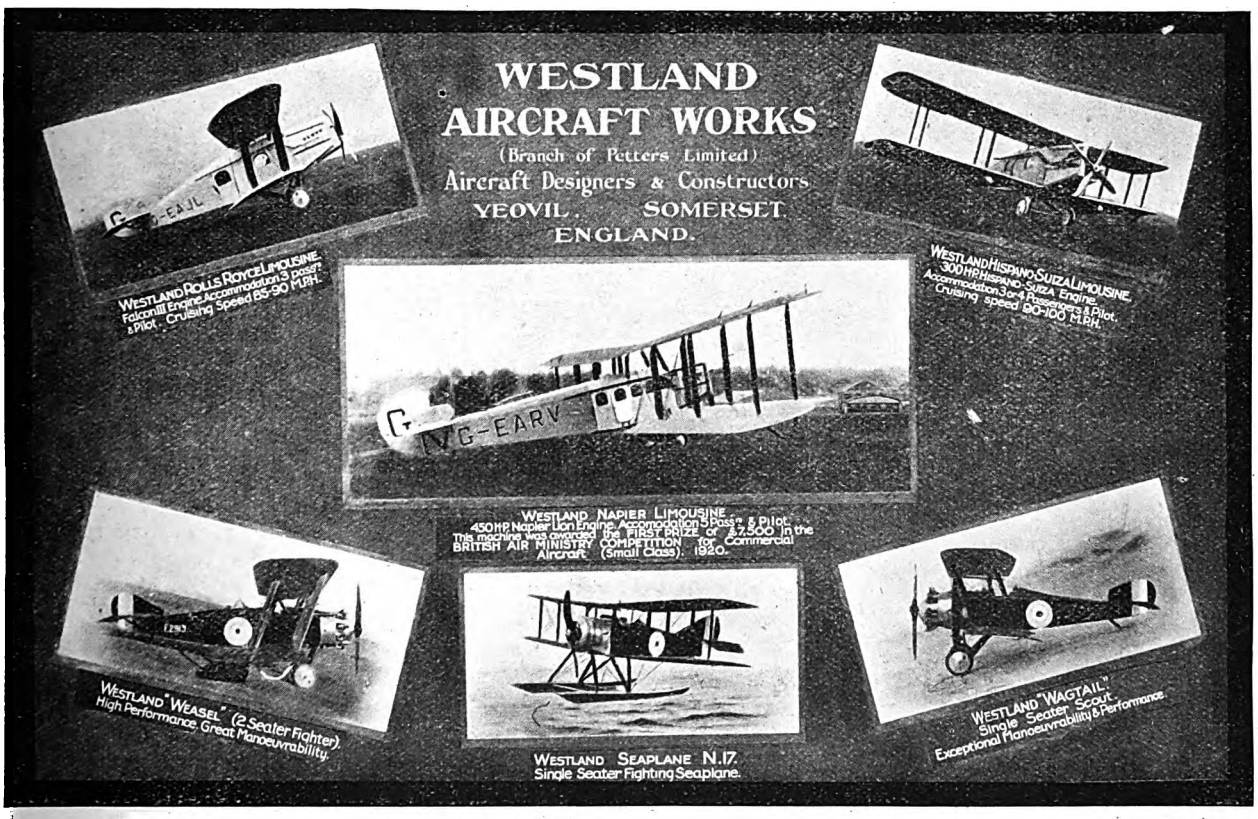
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with the formation of a sound coating, and it is possible to metal-spray highly inflammable materials—even one is assured celluloid—without damage.

In regard to the question of oxydisation it is alleged that the velocity of the issuing spray is so high that there is not time for oxydisation to occur. This is a little difficult to believe. What is probably the case is that on impact with the coated object the skin of oxide round each globule of metal and any oxide skin on the plate are mechanically disrupted and thus the clean metal surfaces are free to unite.

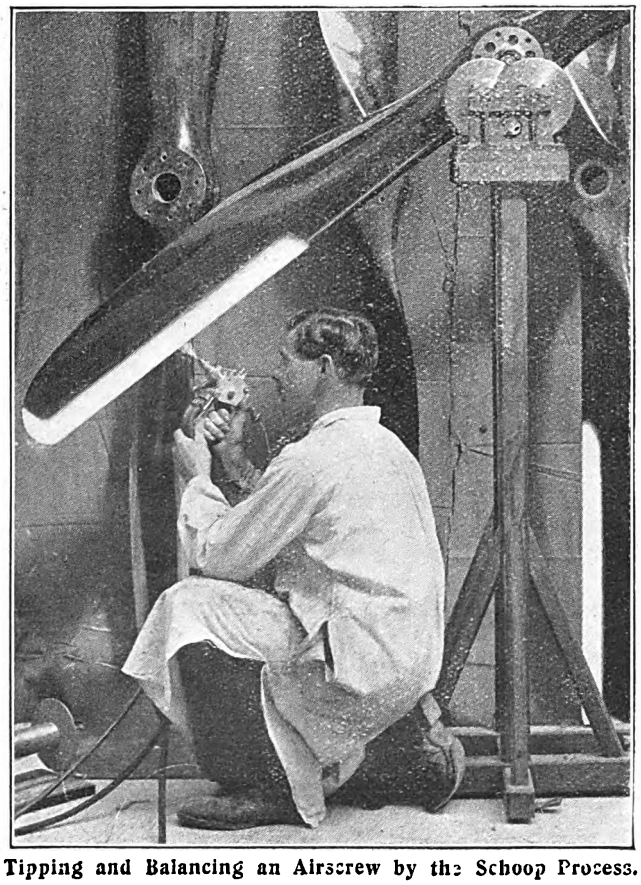
As to the absence of heating effect, this is a little more easily understood. The mass of the sprayed metal is small, and so therefore is its heat content. The velocity of impact is extremely high, and assuming that the mechanical disruption of any oxide film occurs as suggested above, the process is one of low temperature welding under very great local pressure due to the impact of the spray with the plate.

Practically any metal can be projected with the apparatus at quite a low cost. During the war the Schoop pistol was used in Germany to repair damaged or defective aero-engine crankcases, etc.—in one case 150 crankcase castings for the 200 h.p. Benz engine which would have had to be scrapped owing to foundry faults were repaired and used. The defective parts were first sprayed with a very thin coat of iron and afterwards with sufficient aluminium or aluminium alloy to build up the defective part. Apparently the iron film gives a more thorough bonding between the original casting and the new metal than can be attained with aluminium alone.

The Schoop process has been used to protect duralumin against corrosion with very satisfactory results. Paints or varnishes are known which form a satisfactory protection for this alloy, but it is sometimes difficult to secure proper adhesion of the paint to the metal. The Schoop process has been used to cover the duralumin with a film of metal to which the varnish coat would adhere with certainty and experiments are now in progress for the use of a Schoop applied metal coat as the sole protection for this alloy. These promise to give very satisfactory results—but the work is still in the experimental stage.

It is noteworthy that the development of the Schoop process has been considerably assisted by the Junkers Werke at Dessau who have taken a very active part in investigating its uses for aircraft work.

An application of very considerable aeronautical interest which has proved thoroughly satisfactory is the metal tipping of airscrews for seaplanes. For this purpose three or four coats of zinc are sprayed directly onto the airscrew tip followed by a similar number of layers of "Stainless" steel has been found to give a thoroughly satisfactory protection.



Tipping and Balancing an Airscrew by the Schoop Process.

THE "WREN" ON TEST.

The 68-minutes' flight by the "Wren" (briefly reported in last week's issue) was made in the early hours of the morning on June 15 by Major M. E. A. Wright after a lengthy wait for suitable weather.

The machine was flown for practically the whole time at full throttle, and used distinctly less than one gallon of petrol—despite the fact that the carburettor is giving far too rich a mixture.

The maximum speed level is approximately 52 m.p.h., and the machine can be flown at less than half this speed. It appears to be climbing as strongly at 2,200 ft. as at sea level, so that it must have a highly respectable ceiling.

It is said to be extremely simple to fly, takes its correct bank and holds it under the action of the rudder only, and answers its controls in an entirely satisfactory manner. It appears to be thoroughly stable—and in fact the opinion has been expressed that it is so easy to fly that the type can be of little value for training purposes, as a pilot who could fly it satisfactorily would probably crash any normal machine if he was transferred to it from the "Wren."

This opinion may perhaps be modified if the results of putting a really "ham-fisted" pilot up on the "Wren" are carefully observed.

ROLLS-ROYCE REVS.

Those who use the British Air Lines and also those who do not will gain a better idea of the arduous work which is imposed on the engines used in that service when they learn that, according to records maintained by Rolls-Royce Ltd., the Roils engines on the London-Paris Handley Page machines flew for 2,100 engine-hours between Oct. 1, 1922, and May 31, 1923. At 1,500 r.p.m. average this amounts to 3,150,000 revolutions.

Rolls-Royce aero-engines have now to their credit a total mileage of 1,225,243, in civil aviation alone, so far as can be discovered from the records up to May 31 last.

HIGH SPEED LUBRICATION.

It will be of interest to those who are concerned with aircraft engines to note that the Curtiss C.D.12 engine used by Lieut. R. L. Maughan, U.S. Army Air Service, in his various record flights in the Curtiss Army Racer, was lubricated with Gargoyle Mobiloil "B" and was run on pure aviation spirit without the addition of benzol. Mr. Maughan's speed over the measured mile at McCook Field, Dayton, Ohio, was 236.5 miles per hour, and the Curtiss C.D.12 naturally has to do a considerable number of revolutions per minute at such a speed. Therefore lubrication is a matter of considerable moment though people are a little bit apt to lose sight of the part played by oil on these occasions because the total amount of oil used is so small. The Vacuum Oil Company, Ltd., who are the proprietors of Gargoyle Mobiloil deserve to share the credit for this latest achievement.

THE "GULL" GOES ACROSS COUNTRY.

On Monday, June 18, Major Gnosspelius' Blackburn-engined monoplane flew from Lympne to Rochester. Close to this town the air-valve of his pressure petrol system failed, and Mr. Lankester Parker had a "forced land" in a potato field. This was accomplished without damage either to the "Gull" or to the potatoes.

After replacement of the valve the machine returned to Lympne.

On Saturday, June 23, after the competitors in the Grosvenor Cup Race had left the machine was brought out and made several flights during the day. A certain amount of trouble was encountered in starting, due to an enfeebled magneto and to carburetter trouble, also to a recrudescence of the pressure system trouble. However the machine gave a very interesting display and in very bumpy weather displayed an admirable controllability.

On one occasion during the afternoon, when the wind had gone round to the South-West, Mr. Parker took the "Gull" over the ridge to the south of the Aerodrome where the ground falls abruptly away to Romney Marsh.

As soon as the machine reached the zone of up-currents it shot up some 800 ft. in an astonishingly few seconds.

MORTGAGES AND CHARGES.

LANG PROPELLER, LTD.—Second charge on the company's undertaking and property, including uncalled capital (subject to prior mortgage dated Dec. 10, 1920), dated June 6, 1923, to secure £25,000 and further sums payable under a guarantee to Westminster Bank, Ltd., not exceeding in all £35,000. Holders:—Gwynnes Engineering Co., Ltd., Crisp Road, Hammersmith, W.6.

ADAM, GRIMALDI & CO., LTD.—Debenture, charged on premises at Albert Embankment and Glasshouse Street, Lambeth, and the company's undertaking and property, present and future, including uncalled capital, dated June 11, 1923, to secure all moneys due or to become due from company to Lloyds Bank, Ltd., not exceeding £30,000.

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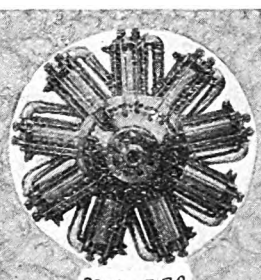
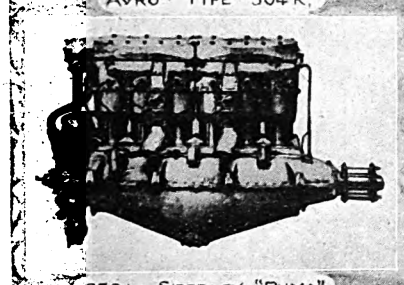
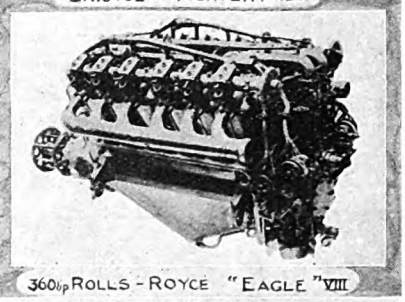

200 h.p. B.R.2

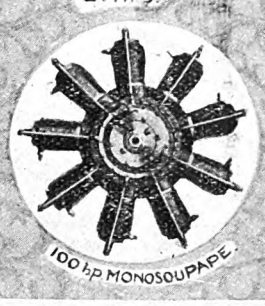
BRISTOL FIGHTER. F.2B.


230 h.p. SIDDELEY "PUMA"

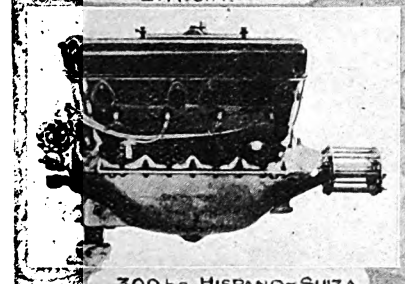
D. H. 9.

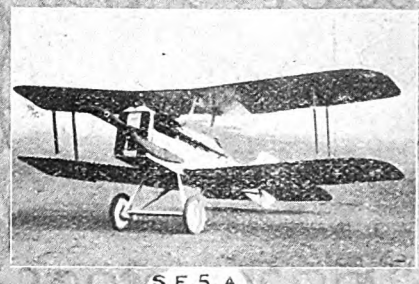

360 h.p. ROLLS-ROYCE "EAGLE" VIII.

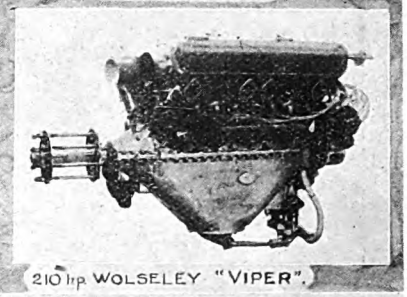
D.H.9.A.

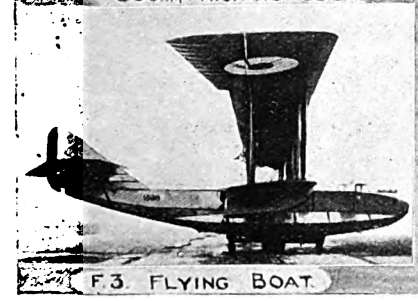

100 h.p. MONOSOUPAPE

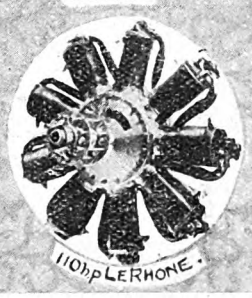
MARTINSYDE. F.4.


300 h.p. HISPANO-SUIZA.


S.E.5.A.


210 h.p. WOLSELEY "VIPER".


F.3. FLYING BOAT.


110 h.p. LE RHONE.

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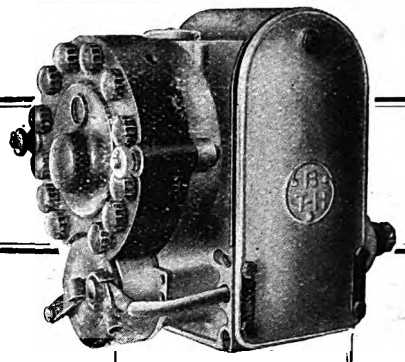

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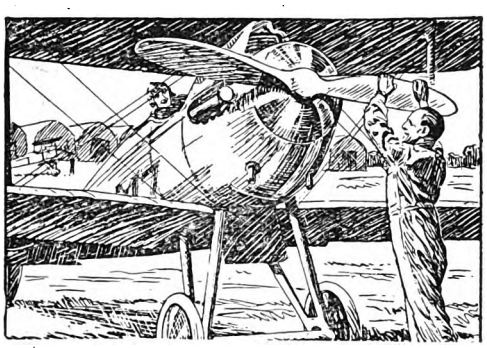

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R.A.F. INTELLIGENCE.

Appointments.

From the *London Gazette*, June 19

R.A.F. GENERAL DUTIES BRANCH.—F/Cdt. R. H. S. Spaight, having successfully passed through the R.A.F. (Cadet) College, is granted a perm. commn. as a P/O. (April 21).

The following are granted short service commns. as F/Os., with effect from, and with seny. of, the dates indicated: L. Butler (June 11); E. D. Cummings, A.F.C. (June 7); H. V. David (June 7); O. V. Lee (June 12); C. E. C. Penny (June 6); B. G. Pool (June 11).

F/O. C. H. Harrison is placed on a p., Scale B (June 9).

RESERVE OF AIR FORCE OFFICERS.—CLASS A:—The following are granted commns. on probation in the ranks stated in the General Duties Branch:—

F/Os. W. E. L. Courteney (Apr. 20); H. A. Francis, A.F.C. (June 11); H. V. Barker, R. C. Berlyn, H. P. Dean, C. Duttson, A. C. Ferguson, D. B. C. Fulton, T. A. Gladstone, A.F.C., M. N. Hancocks, C. G. Kitchingman, A. R. Macdonald, C. O. Meeke, A. G. Lamplugh, R. D. de L. Miller, A. D. Pearce, L. Rawlinson, J. W. Richards, E. D. Salthouse, F. W. Webster, W. H. Whitlock, B. S. Wilcox, D.F.C., E. G. H. C. Williams (June 19).

P/O. W. F. Jaggs (Apr. 20); A. A. Downs (June 4); C. L. Atkinson, H. C. Biard, G. Burton, R. J. Ewins, G. S. Fenwick, H. W. B. Hansford, T. A. Jackson, A. Lewis, J. Marsh, T. T. Williams, C. L. Wilson (June 19).

CLASS C:— F/O. J. G. Weir, C.M.G., C.B.E., is transferred from Class A to Class C, and is granted rank of Air Commodore (May 18); F/Lt. S. E. Mailer, A.F.C., is transferred from Class A to Class C (June 8).

Week ending June 25.

GENERAL DUTIES BRANCH.—F/Lts. J. L. Vachell, M.C., to R.A.F. Depot (Non-effective Pool), 26/5, on transfer to Home Estab.; W. F. Anderson, D.S.O., D.F.C., to R.A.F. Depot (Non-effective Pool), 27/5, on transfer to Home Estab.; E. I. Bussell, to Inland Area Communication Flight, Northolt, 18/6; R. E. Nicoll, to Station Commandant, Iraq, 29/5; J. S. Holloway, to No. 7 Sqdn., Bircham Newton, 1/6.

F/Os. H. J. T. Russell, to R.A.F. Depot, 4/6; R. C. Wansbrough, to No. 1 School of T.T. (Boys), Halton, 1/7; C. H. Brill, to R.A.F. Base, Gosport, 22/6, C. Sutton, to No. 70 Sqdn., Iraq, 19/5, F. Carpenter, to No. 12 Sqdn., Northolt, 14/6; J. Noonan, D.S.M., to Boys' Wing, Cranwell, 15/6; R. R. Money and W. G. Pudney, both to R.A.F. Depot, 14/6, on appointment to S.S. Commns.

P/Os. S. H. G. Trower and G. W. Dean, both to R.A.F. Base, Leuchars (No. 403 Flight), 22/6; R. H. Giles, to No. 4 F.T.S., Egypt, 14/5, on appointment to a S.S. Commn. for course of instruction.

MEDICAL BRANCH.—F/Lts. (Medical) T. C. St. C. Morton, M.D., D.T.M., to Palestine General Hospital, 16/5; J. R. Crolius, M.B., to Military Detention Hospital, Jerusalem, 21/5; T. M. Walker, to Palestine General Hospital, 16/5; J. A. Quin, M.D. B.A., to R.A.F. Depot, 25/6; C. A. Harrison, to No. 56 Sqdn., Hawkinge, 8/5.

F/Lt. (Q/Mstr., Medical) H. Steele, to Palestine General Hospital, 16/5.

STORES AND ACCOUNTANTS BRANCH.—F/Os. (Accountants) J. R. Bond, to No. 1 School of T.T. (Boys), Halton, 30/5; N. E. D. Hutchinson, to No. 7 Sqdn., Bircham Newton, 20/6.

F/O. (Stores).—A. H. Allan, to No. 7 Sqdn., Bircham Newton, 1/6.

The C.F.S. Aerial Display.

An Aerial Pageant was held at the C.F.S. Upavon on June 16 and in spite of bad weather it was a great success. Among those present were the Duke of Sutherland, Air Vice-Marshal F. A. Higgins, C.B., D.S.O., A.F.C., Air Vice-Marshal Sir W. G. Salmond, K.C.M.G., C.B., D.S.O., Air Cmdre. E. A. D. Masterman, C.B., C.B.E., C.M.G., A.F.C., and Sir Godfrey Paine, K.C.B., M.V.O.

In addition to the Aerial Display a cricket match was played between the C.F.S. and the Machine Gun School, Netheravon, the C.F.S. winning.

Flying started at 17.00 hours a formation of Avros with parachute descents being the first event on the programme. This was immediately followed by a Snipe attack on the Avros and then aerobatics by the Snipes including the usual half-roll on top of a loop, Immelman turns, upside-down flying, etc.

A landing competition for Avros was held and an Alarm Race, each team for the latter consisting of one pilot, one observer, one N.C.O. and one aircraftsman.

Both the Central R.A.F. Band and the C.F.S. Band played during the afternoon.

The Aerial Display at Andover.

A fortunate assembly under a real summery sky at Andover on June 23 witnessed the second aerial display by No. 7 Group of the R.A.F. which comprises a number of units of the R.A.F. in the Salisbury Plain Area.

The day's programme, in addition to the aerial display included sports events and numerous sideshows such as Wireless and Photographic demonstrations, music by Group Bands comprising at least 70 performers, a cinema, etc.

The first event was a Class Race open to all the units in the Group. The race was judged by Air-Cmdre. E. A. D. Masterman, C.B., C.M.G., D.S.O., A.F.C., commanding No. 7 Group. The final was won by F/O. E. Bond, of No. 1 F.T.S.; F/O. T. Rose, of the same school being second. The distance was about 13 miles round a triangular course. The winner's time was 8 mins. 50 secs.

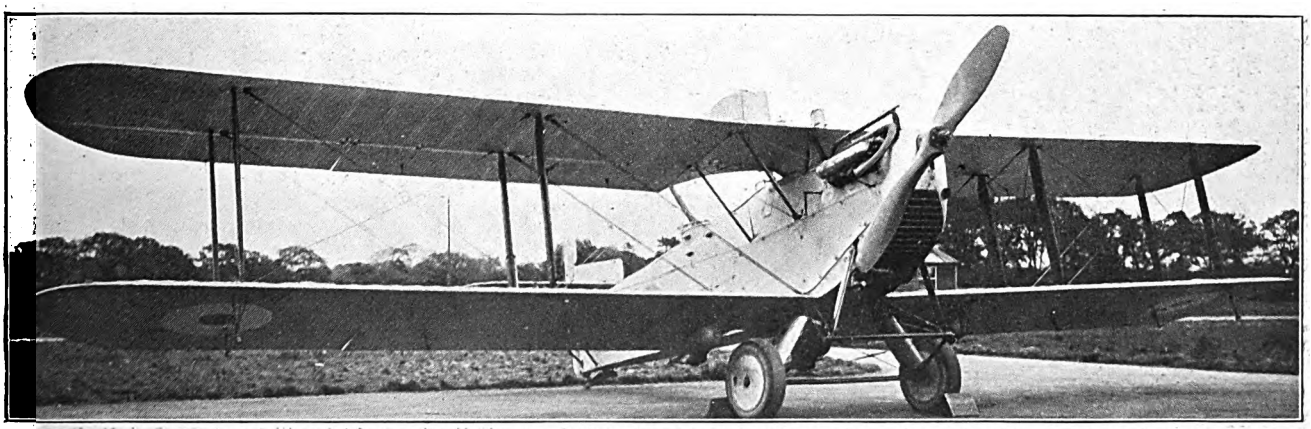
Event No. 2 began whilst the first event was still in progress, and was an exhibition of "Formation Flying." This was very well done by F/Lt. H. G. Locke, D.F.C., and F/Os. Brown, M.M., Hemming, E. G. Pratt, J. G. Horne, all of No. 2 Squadron, on Bristol "Fighters."

The next event was a competition in picking up messages from the ground. A cord is laid across the tops of two posts, in the first instance 8 yards apart. A small grapnel hangs beneath each of the competing machines which have to be flown so that the grapnel hooks onto the cord and pulls up the message. Each pilot in turn dives for the message and picks up the message as soon as possible after the signal has been made from the ground. Each successful pilot in the first trial, makes a second attempt but with the posts closer together. A third attempt is then arranged when the posts are only 3 yards apart. This competition was won by F/Lt. Stevenson, of Old Sarum, who carried away the message on each of his three attempts without any apparent difficulty.

"Crazy Flying" which was also described as the "Timid Pupil's First Solo" was the next event on the programme. A timid pupil might have made, by accident, *one* of the scores of hair-raising stunts performed by F/O. W. V. Mann, D.F.C., but it would almost certainly have been his last, at any rate for a considerable time to come. F/O. Mann however seemed to accomplish the impossible in his sharp turns with the machine banked the wrong way, flying sideways, etc., all within a few feet and sometimes only inches from the ground.

Event No. 5 was a Relay Race between 7 teams each team consisting of one Bristol "Fighter" and one Avro. This event was won very easily by the team from Netheravon, S/Ldr. W. Sowrey, D.F.C., A.F.C., and F/O. Feather, who did the course between them in 16 mins. 45 secs. The second team were F/Lt. Ledger, M.B.E., and P/O. Dodd, No. 11 Sqdn., Andover.

"Aerobatics" included an exceedingly realistic display of fighting in the air. A formation of Avros was attacked and quickly broken up and dispersed by a formation of Snipe. A number of successful parachute descents were made from the Avros by dummies. The Snipe concluded the event by a series of concerted, nose-dives, loops, rolls, and "upside-down" flying. The pilots were S/L. H. G. Smart, O.B.E., D.F.C., F/Lts. A. W. Parr, E. D. Atkinson, D.F.C., A.F.C., K. B. Lloyd, A.F.C., and F/Os. W. E. G. Mann, D.F.C., N. C. Waltho, R. C. Brading, G. M. Trundle, D. H. de Boulay, and B. K. D. Robertson, A.F.C.



PAGEANTRY.—The New Fairey "Faun" (Napier "Lion" Engine) which will be one of the attractions at the R.A.F. Pageant on Saturday.

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY.

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The next event consisted of a combined Alarm Race and Landing competition. 12 machines, Bristol "Fighters" and Avros, took part.

Each machine had one pilot, one observer, one N.C.O. and three Aircraftsmen. On the signal for the start being given the crew wheeled their machine by hand to a line 50 yards distant where the pilot and observer took their places in the machine; the engine had then to be started, the machine taken off, and climbed to a height of, 500 ft. in the case of an Avro, or 1,000 ft. if a Bristol. The pilot had then to land with engine stopped, on a given mark on the aerodrome. The winner was the one who completed the performance in the shortest time and finished nearest to the mark. This event was won by F/O. Howard on a Bristol "Fighter" and F/O. Hall on an Avro.

No. 8 event was a "Bombing Attack." A village painted white with green-painted creepers and shrubbery was the object of the attack by three D.H.9a bombing machines. The dainty-looking village was marked KRUPP in large black letters on one of the walls, so the right thing to do was to blow it up. This was done very thoroughly; the interior of the village must have been a concentrated munition factory, judging by the explosives and volumes of smoke which followed the attack and which left nothing but a few charred sticks to show the original site of the "village."

[Some people had dim hopes that the cricket pavilion which obstructs the aerodrome might have been used for this purpose.—Ed.]

"The Mystery Machine" was more of a mystery even than it had intended to be, for the machine itself failed to turn up at Andover at all, and the pilot "Count Standbackski" must still be standing back, probably in a field some distance away where it is understood he had had a forced landing.

The most thrilling and neck-aching exhibition of the afternoon followed. This was an exhibition of aerobatics on a D.H.10, a twin-engined machine, piloted by F/O. J. S. Chick, M.C., of the R.A.F., Farnborough, who did gigantic loops and rolls and Immelmann turns and left many of the spectators on the ground probably much more breathless than the pilot himself.

A mechanical transport competition open to all the units in No. 7 Group was held for the best turned-out lorry, tender, and motor-cycle and side-car. The vehicles after a very thorough inspection conducted by Air-Cmdre. H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., were driven round a marked course, the drivers of tenders and motor-cycles having to change a wheel en route. The best turned-out vehicles were:—Lorry from the Co-operation School, Old Sarum; Light Tender from No. 11 Sqdn., Andover; Motor-cycle and side-car from No. 11 Sqdn., Andover.

The lorry driving test was won by No. 1 F.T.S., Netheravon. The Light Tender driving by the C.F.S., Upavon, and the Motor-cycle and side-car driving by No. 11 Sqdn., Andover.

A special reference should be made to the photographic and wireless demonstrations, the latter by the Electrical and Wireless School

The most popular event of the sports programme was the inter-unit tug-of-war judged by Air-Cmdre. R. H. Clarke Hall, C.M.G., D.S.O. After some hotly-contested pulls the C.F.S. team won.

It was estimated that some 4,000 people were present as guests. Winchester College was well represented. Most of the inhabitants of the surrounding villages as well as Andover Town must have turned up in spite of the out-of-the-way position occupied by the aerodrome at Andover.

The Palestine Pageant.

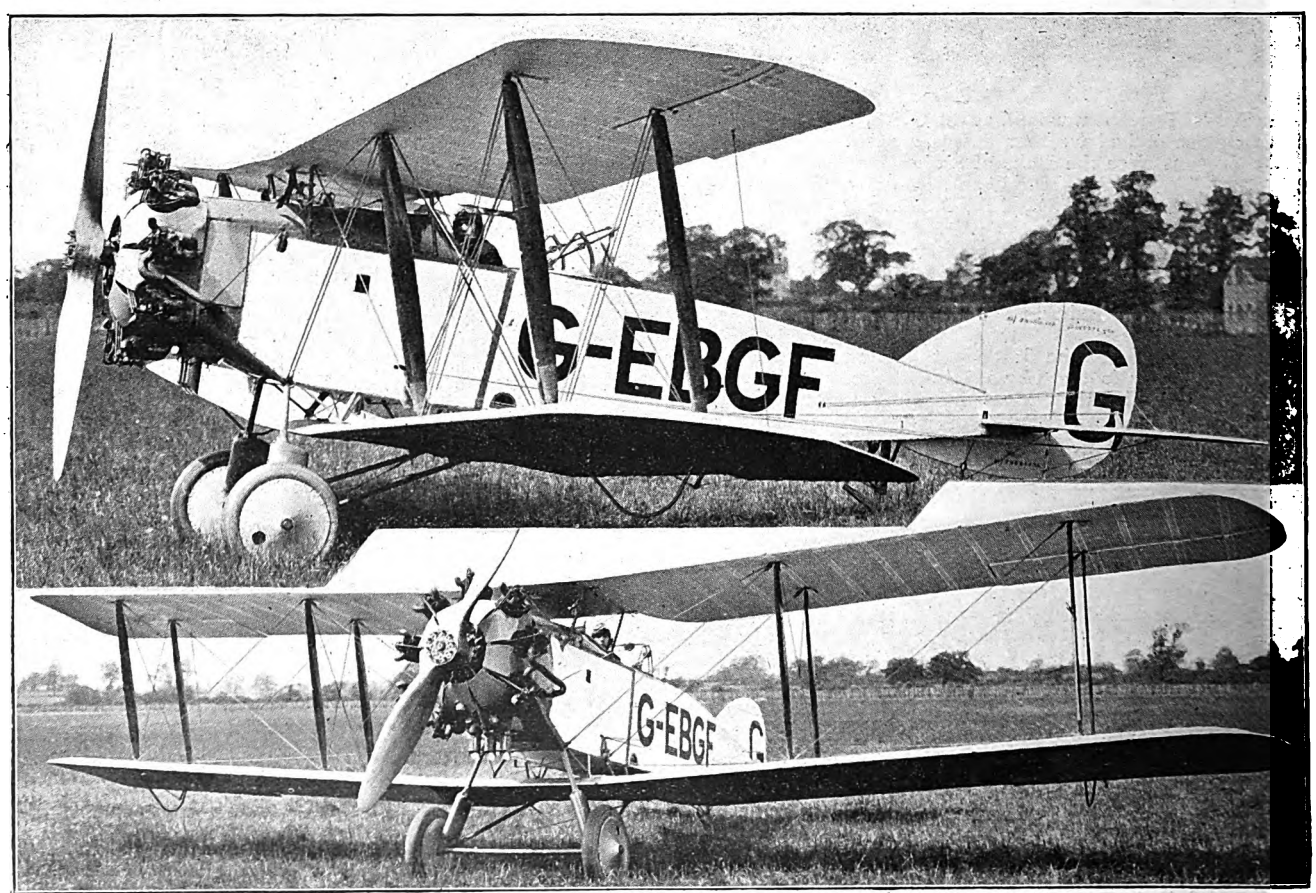
The first Aerial Pageant organised in Palestine was held at Ramleh on May 15, Wing/Cdr. T. O'B. Hubbard, M.C., A.F.C., being the handicapper and chief judge. The organising committee consisted of S/Ldr. J. S. T. Bradley, O.B.E., Chairman, Wing/Cdr. Hubbard, S/Ldr. Wigmore, F/Lts. Sorley, Harrison and Adams and F/O. Lawson. Col. C. Evans, C.B., C.M.G., D.S.O.; Grp/Capt. N. D. K. MacEwen, C.M.G., D.S.O.; Col. A. J. McNeill, C.B., D.S.O.; Maj. F. W. Bewsher, D.S.O., M.C., and S/Ldr. A. C. Wright, A.F.C., acted as judges.

The Pageant was run very much on the lines of the Annual R.A.F. Pageant in England but owing to legal difficulties regarding responsibility to the Public no "gate" was possible for the Memorial Fund.

The programme, which is printed in English, Arabic and Hebrew, to prevent jealousy, shows nine events beginning with a relay race in which the teams consisted of Avros, Bristol "Fighters," and "Nineacks." The winners of this were No. 2 Team, F/Lt. Salt and F/Os. Culley and Morris.

Event No. 2 was an aerial combat between two Bristol "Fighters" piloted by F/Os. Bruce and Marsden.

A Bristol "Fighter" race over a triangular course of 27 miles for a challenge cup presented by the High Commissioner had ten competitors, the winner being F/Lt. R. Harrison, F/O. Marsden second, and F/Lt. Sorley third.



MORE PAGEANTRY.—The New Bristol "Fighter" (400 h.p. "Jupiter" Engine) which will be at the R.A.F. Pageant on Saturday.

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P/O. Falconer won Maj.-Gen. Sir H. H. Tudor's challenge cup for landing on a mark.

A demonstration of how messages are picked up by aircraft when it is inconvenient to land was the fifth event, F/O. Collingwood being the pilot.

Twenty-one competitors entered for the balloon hunt, F/Lt. G. Martyn being the winner.

The Palestine Aerial Derby, a handicap open to all types of machine over the same course as the third event, was won by F/Lt. G. Martyn, 216 Sqdn., on a Vickers "Vimy."

Event No. 8 was crazy-flying on an Avro by F/Lt. Noakes, whose previous exhibitions in this country have reduced vast concourses to a helpless state of laughter or terror.

The Pageant ended with a bombing and machine-gun attack in which a formation of three Bristol "Fighters" attacked and destroyed an enemy explosion factory.

A cup was presented by S/Ldr. Bradley to the Flight of 14 Sqdn. which put up the best performance of the day and this was won by "B" Flight.

The weather was perfect and there were about 7,000 onlookers. Among the guests were H.E. the High Commissioner and Lady Samuel and Air Vice-Marshal Sir E. L. Ellington.

Co-Operation in Waziristan.

The *London Gazette* of May 25 contains the following announcement :—

The King has approved of the following rewards for distinguished service in the Field with the Waziristan Force :—

DISTINGUISHED SERVICE ORDER.—Maj. Arthur E. B. Parsons, O.B.E., 2nd Bn., 12th Frontier Force Regt., I.A.

As Political Officer he volunteered to fly as a passenger with the R.A.F. Squadrons in bombing operations against the hostile Mahsuds, whose location in difficult country it was hardly possible to find except under his personal guidance. This he has done on several occasions with complete success, and has shown conspicuous daring and initiative in finding the targets. While guiding the raid on the Jelal Khel on Dec. 24, 1922, he was severely wounded in the arm while flying at a low altitude. His gallantry has been of the greatest value to the R.A.F. in enabling them to find and deal with their objective.

The W.R.A.F. O.C.A.

The official leaflet of the W.R.A.F. Old Comrades' Association states that the Annual General Meeting of the Old Comrades' Association, W.R.A.F., was held on April 7. The President, Prof. Dame Helen Gwynne Vaughan, was in the Chair.

After the election of Officers and Committee the President proposed the following resolution which was carried unanimously :—"The members of the Women's Royal Air Force Old Comrades' Association assembled at their Fourth Annual Meeting desire to offer to Grp/Capt. H.R.H. the Duke of York very cordial good wishes on his approaching marriage and trust that many years of happiness lie before him."

The President then reported the main features of the past year's work. The Treasurer (Mrs. W. M. Corbett) said that the income of the O.C.A. for the year had been £401 11s. 1d. and the expenditure £190 11s. 2d.

The Secretary (Miss O. E. Williams) reported that the Membership stood at 1,573 and there were 37 branches. Employment had been found for 46 out of 58 applications.

The following letter has been received from H.R.H. the Duke of York by the General Secretary :—

"Buckingham Palace, April 12, 1923

"Dear Madam,—The Duke of York has desired me to ask you to convey to the President and Members of the Women's Royal Air Force Old Comrades' Association the very sincere thanks of His Royal Highness for the kind message of congratulation on his approaching marriage, which they have offered to him.

"The Duke of York greatly appreciates this token of loyal goodwill from an Association, the members of which performed such admirable service during the War, and hopes that all may know how hearty are his thanks for their felicitations.

"Yours truly, LOUIS GREIG.
"Comptroller to H.R.H. the Duke of York."

An R.A.F. View.

[*The following anonymous effort has arrived bearing an Uxbridge postmark.*—Ed.]

THE AEROPLANE we're pleased to see
Neglects no opportunity
To formulate a policy,
Of which the motto seems to be
"Momentum and Psychology."
They council the Air Ministry
That all the vote expended be,
And scrap the pose of "wait and see"
In fact they strongly urge that we
Show our superiority.

THE R.A.F. SPORTS BULLETIN.

(Published in collaboration with the R.A.F. Sports Board.)

Manston.

The Annual Athletic Sports were held on the Aerodrome on June 21st.

In addition to the usual individual events, with points counting for the "Victor Ludorum" Cup, there were several team events for which a special system of scoring had been adopted, and by which a unit obtained points both for individual wins and team performances. This led to a very close finish between No. 1 Section and No. 2 Sub-Section, the issue being decided only by the last athletic event of the day—the 120 yds. hurdles. As it was the winners obtained 71 points and the runners up 70.

No. 1 Section won, in addition to the Inter-Unit Athletic Cup, the Relay Race Challenge Cup presented by the Ramsgate Borough of Commerce, and the Mile Challenge Cup presented by E. C. Ashwood, Esq.

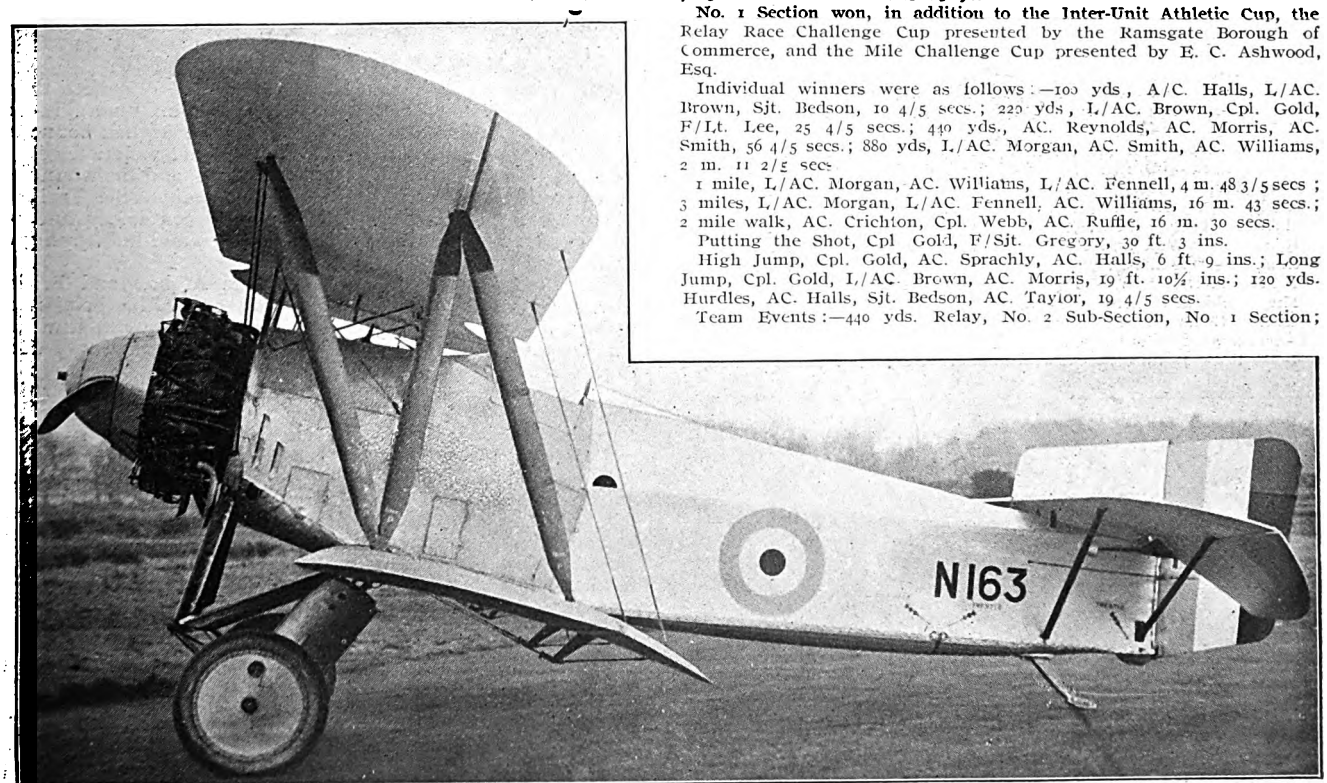
Individual winners were as follows :—100 yds., A/C. Halls, L/AC. Brown, Sjt. Bedson, 10 4/5 secs.; 220 yds., L/AC. Brown, Cpl. Gold, F/Lt. Lee, 25 4/5 secs.; 440 yds., AC. Reynolds, AC. Morris, AC. Smith, 56 4/5 secs.; 880 yds, L/AC. Morgan, AC. Smith, AC. Williams, 2 m. 11 2/5 secs.

1 mile, L/AC. Morgan, AC. Williams, L/AC. Fennell, 4 m. 48 3/5 secs; 3 miles, L/AC. Morgan, L/AC. Fennell, AC. Williams, 16 m. 43 secs.; 2 mile walk, AC. Crichton, Cpl. Webb, AC. Ruffle, 16 m. 30 secs.

Putting the Shot, Cpl. Gold, F/Sjt. Gregory, 30 ft. 3 ins.

High Jump, Cpl. Gold, AC. Sprachly, AC. Halls, 6 ft. 9 ins.; Long Jump, Cpl. Gold, L/AC. Brown, AC. Morris, 19 ft. 10½ ins.; 120 yds. Hurdles, AC. Halls, Sjt. Bedson, AC. Taylor, 19 4/5 secs.

Team Events :—440 yds. Relay, No. 2 Sub-Section, No. 1 Section;



STILL MORE PAGEANTRY.—The New Fairey "Flycatcher" (350 h.p. Siddeley "Jaguar" Engine) which will be seen at the R.A.F. Pageant on Saturday. Her speed range is said to be between 150 m.p.h. and 45 m.p.h. and her landing speed is about 35 m.p.h.

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY.

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1 mile Relay, No. 1 Section, Headquarters Section; 2 miles Relay, No 1 Section, Headquarters.

Ramsgate Challenge Cup, No. 1 Section, No. 2 Sub-Section.

360 yds. Hurdles, No. 2 Sub-Section, No. 1 Section.

High Jump, No. 2 Sub-Section; Long Jump, No. 2 Sub-Section.

Tug-of-War, No. 1 Section, Headquarters; 1 mile Team, No. 1 Section, Headquarters.

"Victor Ludorum," Cpl. Gold, No. 2 Sub-Section.

The prizes were kindly presented by Lady Carson of Duncairn, for whom three cheers were heartily given when called by Wing/Cmdr. J H. A. Landon, D.S.O., O.B.E., Officer Commanding. The meeting was a complete success, and attracted a record crowd (estimated at between 2,000 and 2,500).

Shotwick.

The Annual Athletic Sports took place at Shotwick Aerodrome on June 20. The following are the details:—

100 yards: (1) P/O. Kirkhoe, (2) A.C. Sharp, (3) L/AC. Gage. 220 yds.: (1) AC2. Parrish, (2) P/O. Kirkhoe, (3) Sharp. 440 yds.: (1) Sharp, (2) Parrish 880 yds.: (1) Parrish, (2) L/AC. Riley, (3) L/AC. Sharp.

440 yds. Open: (1) Parrish, (2) Thompson, (3) Pte. Slack (Cheshires). One Mile: (1) Parrish, (2) Sharp, (3) Riley. Three Miles: (1) Riley, (2) AC.2. Samsone, (3) L/AC. Adams.

Long Jump: (1) Sharp, (2) Gage. High Jump, (1) Sharp, (2) P/O. Brooks.

Officers' Race: (1) F/O. Jones, (2) P/O. Malone, (3) P/O. Whinney. Serjeants' Race: (1) Phelps, (2) Parsons.

Officers v. Serjeants Tug-of-War: Serjeants. Inter-Squadron Tug-of-War: No. 2 Sqdn.

Relay Race: No. 2 Sqdn. Putting the Shot, AC.1. Smith.

A Lawn Tennis Match.

The R.A.F. played their fourth match of the season against the Civil Service Lawn Tennis Association on the ground of the latter club on June 23, the match resulting in a win for the R.A.F. by 7 matches to 2.

Results: F/Lt. J. Duminy and F/O. C. F. Roupell (R.A.F.) beat C J. Meads and C. B. Bishop 6—2, 6—0; lost to J. Hubert and W. R. Fraser, 6—2, 4—6, 4—6; beat E. G. Hughes and F N. Worthington, 6—1, 6—2.

F/Lt. V. E. Lindop and F/O. F. Storrs (R.A.F.) beat Meads and Bishop, 6—3, 6—4; beat Hubert and Fraser, 7—5, 6—3; beat Hughes and Worthington, 6—4, 1—6, 6—2.

F/Lt. J. V. Hirst and Lt. F. Smith (R.A.F.) beat Meads and Bishop, 6—2, 6—3; lost to Hubert and Fraser, 5—3, 3—6, 5—7; beat Hughes and Worthington, 6—4, 6—4.

Malta.

In the Inter-part Challenge Shield Competition of H.M.S. *Pegasus*, the R.A.F. team holds first place with the following points:—Matches played 5, Won 4, Lost 1. Goals for 17, against, 5.

In this competition two matches were played during the month; the first game against the Engine Room Dept., was lost by the odd goal in three, the team playing one man short. Sjt. Gardiner scored from a penalty kick. In the second match against the "Daymen," Sjt. Owen scored the only goal from a free kick.

Rugby Football:—Four airmen assisted the ship's team in a Rugby match against a team picked from four destroyers, which won by 9 points to 3.

2. H.M.S. *Ark Royal*: Hockey.—A team of officers from the ship drew with the R.G.A., stationed at Nagara, during the month.

3. No. 267 SQUADRON: Football.—The following Association matches have been played during the month:—7.4.23 v. H.M.S. *Ark Royal* —Lost 1—2. 12.4.23 v. H.M.S. *Centurion*—Won 1—0. 26.4.23 v. R.A.M.C.—Won 2—1.

The result table at the close of the season stands thus: Played 33, Won 17, Lost 8, Drawn 8, Goals for 77, Goals against 56. The goal scorers were as follows:—L/AC. Price 21; L/AC. Harris and A.C.1. Nicholls 11 each; Cpl. Jones 10; L/AC. Arnott 9; L/AC. Shepherd and A.C 1. Bray 3 each; Sjt. Vella and L/AC. Boyce 2 each; Cpls. Williams and West and ACS. Howell, Calver and Bartelo, 1 each.

Hockey:—One match played during April against a team from the 7th Flotilla Destroyers, 10 goals being equally shared.

The results at the end of the season, are—Played 24, Won 11, Lost 8, Drawn 5, Goals for 71, Goals against 58, the goals having been scored by—F/Lt. Stewart 25; F/Lt. Elmhirst 11; F/O. Waring 8; Sjt. Southgate 6; F/O. Pennington 5; Wing/Cmdr. Cull, F/O. Harris and Cpl. Dunn 3 each; L/ACs. Hill, Peel and AC.1. Howell 2 each; L/AC. Yeo 1.

GENERAL: Polo: Since the return to Home Establishment of Air/Cmdre. C. R. Samson, the R.A.F. in Malta have not been sufficiently strong to form a representative team. A number of R.A.F. officers however play in various Club matches. In the "Ormsby Johnson Cup" Competition, F/Lt D. Iron, O.B.E., reached the final and in the "Novices Cup" F/Lts. T. W. Elmhirst and D. Iron assisted the team which was beaten in the final by one goal scored after extra time had been played.

RACING: Two Race Meetings have been held in Malta during April, and on the occasion of the first (Easter Meeting) the R.A.F. Mediterranean were the hosts, entertaining a large number of guests to tea on the course R.A.F. officers participated in the racing either by riding or entering their own ponies.

GOLF: F/Lt. M. A. Simpson recently won the "Andrews Bogey Gold Cup" at Malta. A Polo Gymkhana is among the fixtures for May 1923.

Cranwell.

Boys' Wing, Cricket: May 12, v. Ruskington, won by 67 runs; May 26th, v. Lincoln Chemists, won by innings and 73 runs.

Station Association Football: May 2, R.A.F. Cup Final, v. R.A.F., Eastchurch, won 6—2; May 4, South Lincolnshire League, v. Boston West End, away, won 6—2; May 12, Lincolnshire Junior Cup Final, v Ashby Mill Road, lost, 0—1

Cadets' Cricket: May 19, v. Harmston Park, home, draw; May 26, v Sleaford, away, lost by 2 runs; May 27th, v. Ampleforth College, home, won by 72 runs, May 30th, v. Cranwell 1st XI, home, lost by 8 runs.

Station Cricket: May 26, v. Newark, home, lost by 77 runs; May 30, v. Cadets, home, won by 8 runs.

[NOTE.—*All R.A.F. Sports News for inclusion in the Sports Bulletin including notes hitherto sent direct to* THE AEROPLANE *should in future be sent to the Secretary, R.A.F. Sports Board, Air Ministry.*]

Another Sports Bulletin.

The first number of the *South African Air Force Sports Bulletin*, which is described as a monthly journal devoted to the Air Force Sports Club and published by the authority of the Air Directorate, consists of nineteen pages of mimeographed type beautifully bound in a blue print cover and very badly mimeographed.

The articles include a very sound leader by the editor, Air/Serjt. Upton Smith, on "Playing the Game," and a very interesting article by L/Col. K. R. van der Spuy on the history and objects of the S.A.A.F. Sports Club. The cricket team is dealt with in a candid criticism by "Willow," and the Amateur Dramatic Society in what is probably a less candid criticism by "Romeo." "Uppercut" bemoans the decline of boxing and "Mafoota" hopes the swimming will improve next season.

The Rifle Club reports great keenness and progress and some very good scores. The Soccer enthusiasts want to play league matches on Sundays and the Rugger people suffer from the eternal question of transport. The Sports Club also go in for tennis, hockey, harriers, and run an Entertainments Committee.

The section headed "The Police Are After Us" does not refer to the Stores Branch of the S.A.A.F., but to the fact that in the various games in which the club have met the South African Police the honours are at present with the Air Force.—C. M. McA.

AN ERROR OF JUDGMENT.

The "Manchester Guardian" of June 19 states that:

"Air operations which were carried out on June 2 in the hills north of Dardoni at a point where the Afghan boundary is sharply defined resulted in the accidental violation of the frontier, the killing of two Afghan subjects, and the wounding of five others. The raid was directed against the Tazikhel Waziris as a reprisal for their prolonged contumacy and repeated offences, including firing on troops and kidnapping of Hindus.

"A joint inquiry by officials of the Afghan and British Governments established the fact that some of the bombs fell a short distance on the Afghan side of the Durand line and that in addition to the casualties reported damage was done to livestock.

"His Majesty's Government has instructed the British Minister at Kabul to express their unqualified regret to the Afghan Government at this inadvertent violation of the frontier, and also to pay full compensation at whatever rates may be proposed by local assessors for the loss of life and damage to property inflicted."

It must be very difficult from a bombing height to distinguish between peaceful Afghans and contumacious Waziris particularly when the only difference between them is a frontier consisting of an imaginary line.

A SEAGOING AIR-LINER.—The Supermarine "Sea Eagle" (Rolls-Royce "Eagle IX" Engine) a seagoing amphibian flying-boat designed for the Southampton-Cherbourg Service. She is to be flown in the King's Cup Race.

DO NOT FORGET THE R.A.F. PAGEANT AT HENDON ON SATURDAY.

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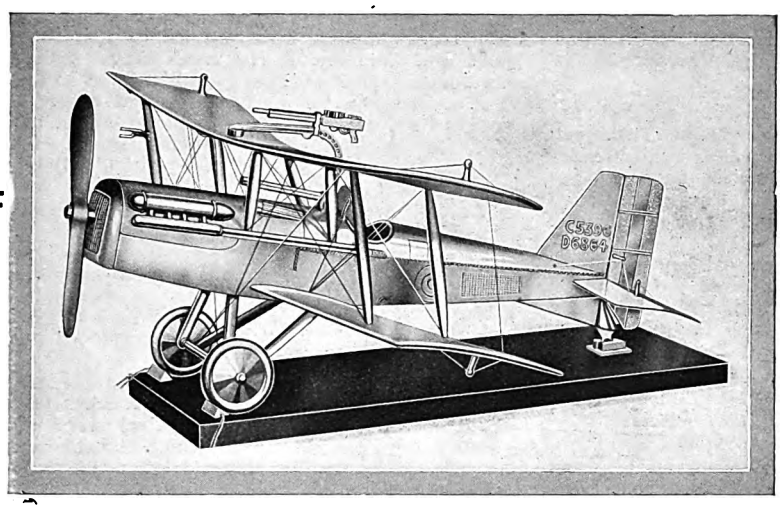

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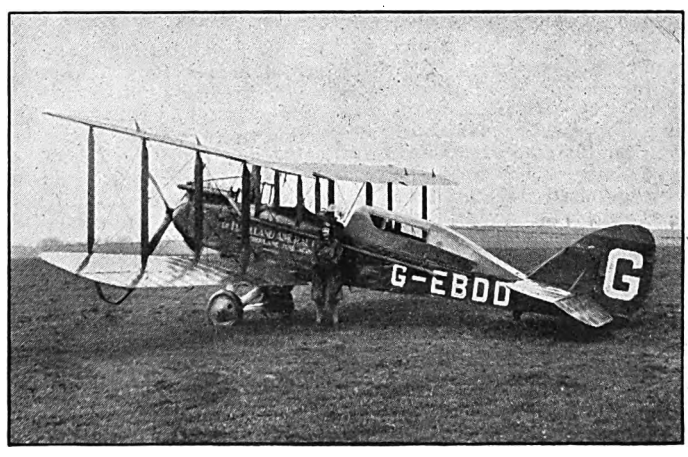

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ON MONGOLS AND THINGS.—(III.)

["On Secret Patrol in High Asia," by L. V. S. Blacker, (Captain, The Guides), 301 + XI pp. John Murray, 18s.]

Friends or Enemies.

In this section of the book Major Blacker speaks very highly of the Turkoman units under a Tekke Turkoman Chief, Sir Oraz Sardar, K.C.M.G., who was our most valuable ally and had been one of the Imperial Pages to the Tsar and a General in the Russian Army. Blacker's detailed descriptions of the Turkoman people will also be of great value to the students of the next war.

Whether they are to be our allies or our enemies it is equally well to know as much as possible about their physical and mental characteristics. And here it is well to quote a remark of Major Blacker's which bears on one's own pet theories. Writing of the Mongoloid peoples as distinct from the entirely savage Mongol of Eastern Siberia he says:—

"He can be most cultured, courteous, and engaging, and it must be recognised that, besides the Aryan, the Mongoloid is the only race that counts in the struggle for world supremacy." This passage should be borne in mind when one is thinking of the Japanese as well as of the Western Asiatic people.

The Perfect Lady.

Hereabouts in the book one meets the most perfect description of the relations between a soldier and his mount that one has ever read, and incidentally Blacker proves fairly conclusively that the English thoroughbred is not of Arab descent but is in fact almost pure Turkoman. As the Great War is bound to be almost entirely an affair of aircraft, tanks and horsemen this matter is of considerable importance. His description of the mare Marushka would be almost sentimental but for its delicate humour, as the following passages may show:

"Like Ninon de l'Enclos, the years had passed over her lightly, nor did her lurid past prevent her from being wholly charming in the present . . . . The wayward old lady has never been trained, but, on the other hand, she is a living proof of the fact that training is only needed for low-bred animals . . . . She has a real eye for a country, and is so inured to war that, whilst a mounted man appearing on the skyline leaves her unmoved if he be unarmed, yet if he have a rifle in his hand she will prick her ears and gently intimate the fact to her rider."

The White Russian.

Major Blacker has a high opinion of many of the "White" Russian fighting men, but the other kind are delightfully described in this passage:—"The other side of the Russian picture was not so pleasant. Whilst the bodies of gallant debonair Punjabis filled great graves in the lonely desert, and whilst barbarian Turkoman left their tents and wives to shoulder a musket for the 'Great White Tsar,' hordes of young shirkers filled the brothels and cafés of 'Ashghabad. A great proportion of them were Armenians whose indes are notoriously valuable, but there were many Russians amongst them of the new Board-school type that has no hesitation in letting others bear the burden of its defence.

"There was once a famous Admiral who, not many years back, went down with his flagship. He was in the habit of reading the Bible every evening in his shirt-sleeves, since the sight of the broad gold ring on his coat-sleeve made it difficult for him to realise the existence of a Superior Being. In the same way, many a herring-gutted undergraduate of the newer type of University has succeeded, by diligent use of the focussing screw, in sighting a bug in a microscope, and from this, like H. G. Wells, deduces the non-existence of an Omniscience, since who can know more than he? Having overturned religion, our young biological 'conchy' has no more trouble with loyalty, patriotism, or the shouldering of any inconveniently altruistic burden. The bone-headed soldier can do that for his princely stipend, and be called a 'gilded popinjay' to boot.

"This cocksure, if pigeon-chested, class is a fine fair field for the Jew, who uses it to disseminate his catchwords amongst the even less instructed slaves of lathe, pot-bank and mine. Here we have Karl Marxism, 'anti-militarism,' Syndicalism, all ready to help to make the worker and the cultivator the bond-slave of the despotic Hebrew."

Guarding the Wall.

One could go on quoting the book and commenting upon it until one filled a whole volume of THE AEROPLANE instead of the few pages which are available. Major Blacker makes no bones about the shameless way in which, as usual, our politicians at home abandoned our allies. Equally as usual the abandonment was marked by amazing heroism on the part of the actual fighting man. The description of Awal Nur's expedition right across 600 miles of Soviet country to take ammunition to the Amir of Bukhara and how he and his one companion got out again is one of the most exciting things in the book.

Thereafter the war was confined to guarding the rock wall itself and here one learns much of the Kurd, a distinctly Nordic person with whom we shall have to do in the Great War. Here also one meets a weird adventure of the ubiquitous Ford driven by a former employee of the London General Omnibus Company. And also one learns a great deal of the composition of the Afghan Army which will be of some consequence in future operations.

Wonders never ceased in this area as for example the capture which meant the saving of seven French Algerian soldiers who after having been captured at Odessa in 1917, when a French battleship hoisted the red flag, had worked their way right across Russia to be nearly killed by the Bolsheviks and ultimately to be rescued in Persia by British Pathan soldiers who had fought alongside them in France in 1915.

The Great Race Question.

In telling of this Major Blacker touches on a subject on which one hopes to say a good deal more at a later date, namely, the curious way in which the different races automatically tended to find themselves on the right side towards the end of the war.

Referring to these Algerian troops he says:—"Their tale brought home to me once again the extraordinary clash of race hatreds that underlay the War of 1914. The backbone of one side were the Mongoloid Prussian, Magyar, Bulgarian, and Turk; on the other, the characteristically Aryan, French, British and Italians. Purely from a racial instinct, too, Punjabi, Moroccan, Circassian, and even the more Aryan sort of Arab, ranged themselves alongside their Occidental cousins, against their co-religionists the Turks, and to such a hearty extent, that, for instance, the three best districts of the North Punjab lost as big a percentage of their men killed on voluntary enlistment as any English county did on conscription. They sent some 300,000 fighting men into the army, of whom some 30,000 lost their lives in their seven years of the Great War and its sequels.

"Our two Mongoloid Allies, drawn into the conflict by financial interest, did not precisely wade in blood on our behalf." [The reference here is naturally to Japan and China.—C. G. G.]

"Were there any doubt that the race-hatred of Mongol against Aryan was the real driving force of the War, one has only to cast one's mind back to Ploegsteert Wood, where Saxon confronted Saxon. Here the two breeds of Aryan *Homo alpinus* sustained a most gentlemanly, not to say genteel, type of struggle; flags were waved before firing started, whilst Mr. H. G. Wells, war correspondents, M.P.'s, and Bishops strolled up the sumptuous communication trenches, down which mess secretaries cycled to buy butter and eggs."

A Matter of Opinion.

One is of the opinion that Major Blacker makes a mistake in talking of the Aryan "race" because in fact one should only talk of the Aryan language which is spoken by a number of people of antagonistic races. Also he lays too much stress on the Mongol, who after all is only one branch of the much greater Japhetic race which includes the Muscovites, Mongols and Turcomans. The Mongol does not include although it is allied to the Bulgar and Turk.

What he calls the Aryan race is in fact the Shemitic race, more commonly called the Semitic race. People are apt to forget that there are millions of Semitic people who are not Hebrews, other millions of Hebrews who are not Israelites and many millions of Israelites who are not Jews. It is on this point that the Great War will ultimately turn, but undoubtedly Major Blacker has struck a great basic fact.

He might have added to it the fact that it was the Muscovite who let us down. One has always had very great satisfaction in recalling that in the very first issue of THE AEROPLANE which appeared after the declaration of war before the days of censors and press bureaux one stated openly that in our alliance with Russia we were fighting on the wrong side. This particular aspect of the War 1914-18 must always be watched when considering the Great War of the future. With this indication of the key to what is really one of the greatest military works of recent years one commends Major Blacker's book to the attention of all serious students of war.

One was glad to see quite recently that Major Blacker has passed successfully through the Staff College at Quetta. In him the Indian Army has undoubtedly gained a very able staff officer. His book gives one the impression that it has been written by a swashbuckling pirate, but on the principle that the ex-poacher invariably makes the best gamekeeper one feels sure that it will be difficult to find a more basicly sound exponent of the immutable laws of war according to Clausewitz or a more punctilious executant of the academic rules of staff work than the author of "On Secret Patrol in High Asia."—C. G. G.

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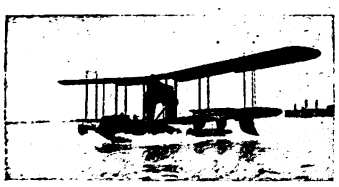

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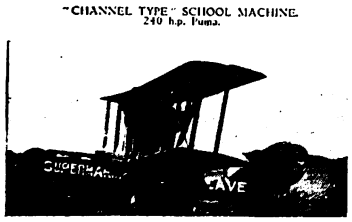

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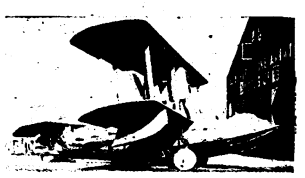

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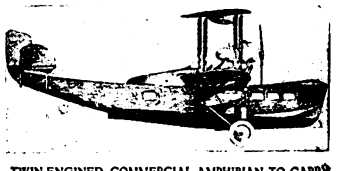

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ANALYSIS OF FIGURES FOR THE PAST WEEK.

TRIPS PER DAY.—Monday, 18; Tuesday, 6; Wednesday, 21; Thursday, 19; Friday, 18; Saturday, 26, Sunday, 12.

LONDON—PARIS:

Handley Page Transport, Ltd., machines 28, passengers 226, freight 7,792 lbs.; Air Union, machines 20†, passengers 30, freight 19,677 lbs.; Total machines 48, passengers 256.

LONDON—BRUSSELS—COLOGNE:

Instone Air Line, Ltd., machines 23†, passengers 74, freight —.

MANCHESTER—LONDON—AMSTERDAM—BERLIN:

Daimler Airway, machines. 27, passengers 79, freight —.

BERLIN—LONDON:

Aero-Lloyd, machines 2, passengers 4, freight —.

LONDON—ROTTERDAM:

K.L.M., machines 13, passengers 18, freight —.

SPECIAL MACHINES:

De Havilland Hire Service, machines 4, passengers 5

Surrey Flying Services, machines 3, passengers 5.

Total number of trips by British machines: 85, carrying 389 pas. Foreign machines: 25, carrying 52 pas.

STATISTICS

For week ending June 24:—

Machines, 120; Passengers, 441; Crews, 194; Total Personnel, 635.

Corresponding week last year:—

Machines, 135; Passengers, 272; Crews, 193; Total Personnel, 465.

Corresponding week, 1921:—

Machines, 105; Passengers, 381; Crews, 122; Total Personnel, 505.

Corresponding week, 1920:—

Machines, 113; Passengers, 217; Crews, 122; Personnel, 339.

Croydon Notes.

Last week was one of the very best in the annals of the air lines so far as passengers are concerned. Nearly 450 were carried during the week and on Saturday Handley Page Transport Limited alone carried 79 passengers. This beats the previous record of 63 in the day by the Instone Air Line.

Mr. Hinchcliffe took G-EBBQ to Berlin for the Daimler airway on Monday, making the journey in 5½ hours. He returned on Tuesday in shocking weather. Herr Kahlow brought the Dornier through on Monday, arriving just before 19.00 hrs. He returned on Wednesday.

Mr. Hinchliffe again went through on BQ on Thursday and returned on Friday. In the two return trips he carried 19 passengers. On one occasion he kept in touch with Croydon by wireless until he reached Bremen.

Mr. Shaw took a D.H.18 to Cologne for the Instone Air Line on Wednesday and returned on Thursday. When he got to Lympne he ran out of petrol (in spite of having all the resources of Shell behind him) and had to land. It was by that time dark and so he came on the next day.

Lt.-Col. G. L. P. Henderson went to Paris on Friday on the Surrey Flying Services' D.H.9. He got there in two hours twelve minutes. On Sunday morning Mr. Hayden took two passengers to St. Inglevert on the Avro and returned with them at 16.38 hrs. At 17.00 hrs. the machine was joyriding round the Crystal Palace.

The Air Minister, Lady Maud Hoare, the Duke and Duchess of Sutherland, Sir Sefton Brancker, General and Mrs. Festing and the rest of the party arrived on Sunday.

Mr. Handley Page who had gone over with the party on Saturday returned the same evening. On the Sunday he had lunch at home at Stanmore, drove to Croydon, took 'plane for Le Touquêt had to come back from Maidstone on one engine owing to trouble in the other, got out another W.8b, flew to Le Touquêt, brought back the official party, and was home at Stanmore in time for dinner.—G. D.

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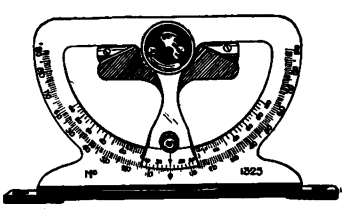

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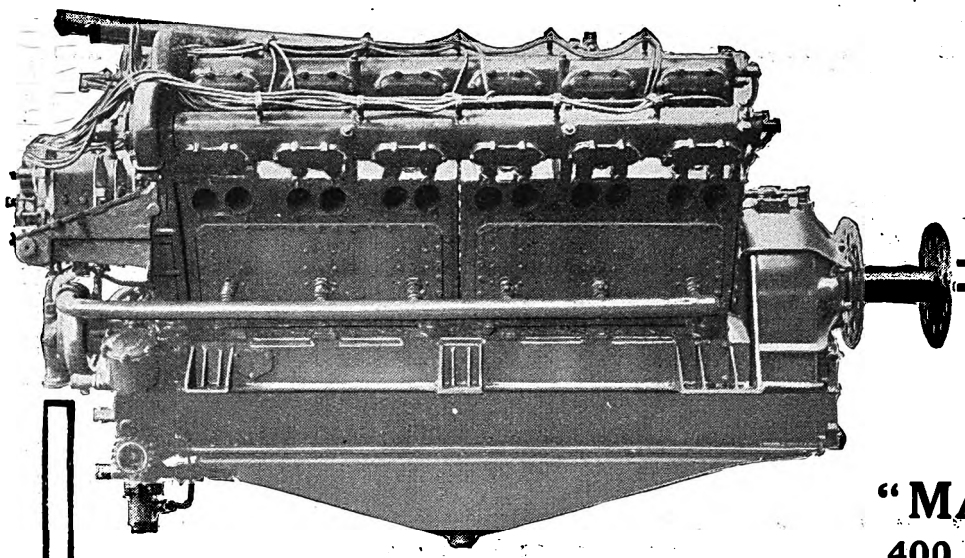

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"MANITOU" ..	300 h.p. 12-cylinder	"COSSACK" ..	350 h.p. 12-cylinder
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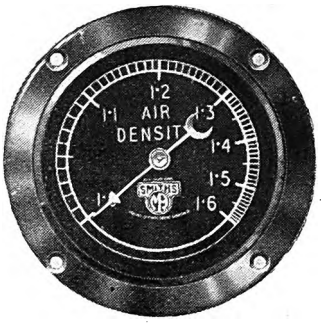

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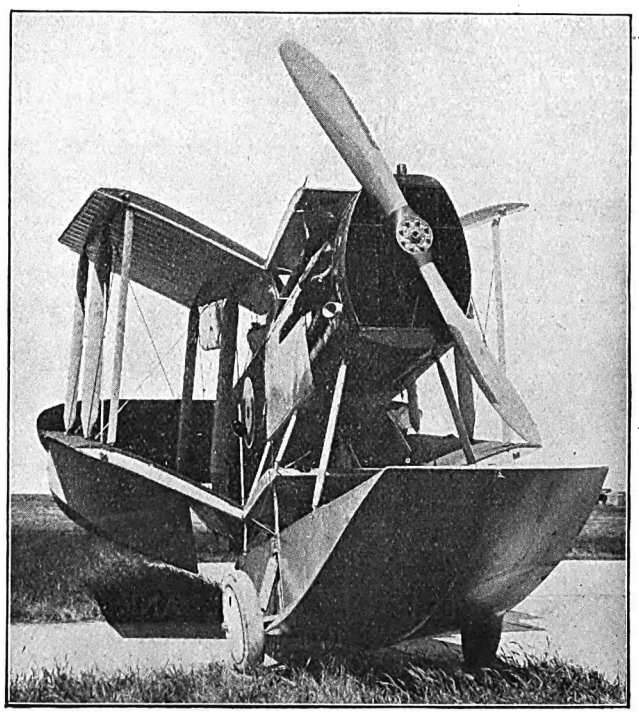

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